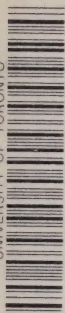


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ROSES AND THEIR CULTURE

S. C. HUBBARD



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MADAME PLANTIER.
An old favorite now seldom seen.

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ROSES AND THEIR CULTURE

HOW TO PROPAGATE, GROW AND
EXHIBIT OUTDOOR ROSES
IN AMERICA

By
S. C. HUBBARD

*Department of Floriculture,
Massachusetts Agricultural College*

ILLUSTRATED

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PREFACE

This little book has been written primarily for the amateur grower—the real lover of the rose—the one who does all the work himself. For the expert or professional gardener there is probably nothing new in the text.

The author recognizes the futility of trying to handle so broad a subject as Rose Culture comprehensively in so small a volume, consequently only the most important features have been touched upon. The facts are set forth as they have been found during seventeen years of close work with the rose.

It is impossible to give any hard and fast rules for the culture of any plant which will apply in all cases. There may be suggestions herein offered which will not be applicable to all garden conditions. However, if the readers find some of the so-called mysteries of rose growing made clear, the author's object will have been accomplished.

Thanks are due to Professor F. A. Waugh for his many helpful suggestions and kindly criticisms as well as for the use of some of his photographs.

To Doubleday, Page & Co., thanks are also extended for the use of photographs and bloom statistics which first appeared in one of their publications.

S. C. HUBBARD.

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CHAPTER I

THE GARDEN

An ideal location for roses is difficult to obtain. To begin with, roses must have sun, especially during the early morning hours, but on the other hand many of the delicately colored varieties fade or burn in an intense sun. This means that our ideal garden should have some shade during the brightest part of the day. Yet we cannot plant too close to the trees for the tree roots will rob the roses of food. As a general rule a tree sends out roots in a circumference the radius of which equals its height. The small roots at some distance from the trunk can be cut without injury to the tree but they will soon grow again. This is especially true when the soil is enriched, as it must be to grow roses. The ideal garden is airy, yet must be sheltered from the prevailing winds. Roses can not stand wet feet, therefore the site must be well drained. Low places are to be avoided because of the liability to late frosts and poor drainage.

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A southern or southeastern exposure is usually the best. If there be a gentle slope to the site so much the better. While the above mentioned conditions are considered ideal, they are not absolutely necessary. In fact, roses will give fair returns on almost any location if they get the sun and are properly cared for.

Whenever it is necessary to plant near trees some provision must be made to keep the roots from the beds. The roots should be cut about one foot back from the edge of the bed and the side of the bed lined with galvanized iron. Wood is sometimes used for this purpose but soon rots away. Perhaps the best way is to put in a light concrete wall, which, of course, is permanent.

The importance of windbreaks must not be overlooked. These may be buildings, hedges, arbors, trellises, etc., but must not be too close to the planting. Something that will break the force of the wind is the object. Good circulation of air is necessary if the plants are to be healthy. There is another point to be considered when discussing shelters. It sometimes happens that while the cold winds of winter are from the

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north the summer winds are from the south. It is these hot, scorching winds that destroy the color of the flower and often burn the foliage. These conditions obtain to a greater extent farther inland than near the coast. A hedge or other means of protection entirely surrounding the garden is then the solution. In fact, any garden whether it be rose, perennial or annual should be enclosed. The home garden is in reality an outdoor room and is therefore private.

An arbor of climbers, ramblers trained on a fence or posts, form excellent screens and afford much in the way of windbreaks. The most satisfactory plan or arrangement of a rose garden, whether it be large or small is as follows: The enclosure or border should contain the climbers and pillar types. If Rugosas, Sweetbriars and other large species or their hybrids are to be used they should be planted about eight feet from and parallel with the encircling border. The beds containing the Hybrid Perpetuals should come next with the Hybrid Tea beds in the center. Planting in this general manner gives the tender sorts the maximum protection. When the Rugosas,

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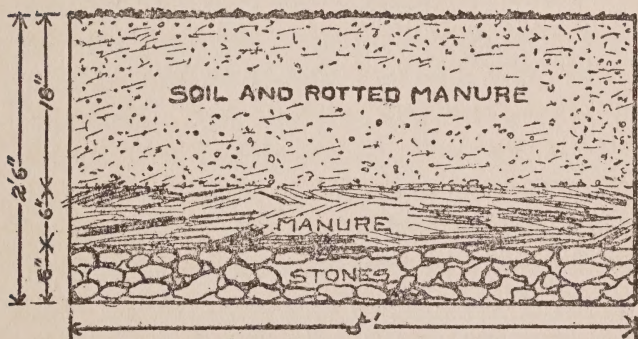
Sweetbriars, etc., are planted in long narrow beds excellent effects are obtained by edging them with the baby ramblers. The polyanthas being more or less continuous bloomers, give color to the border which late in the summer would otherwise be lacking. When there is a great variation in the soil the general arrangement may be changed so that the Hybrid Teas always are in the best location.

Having the general plan in mind the next step is the preparation of the beds. It is sometimes advocated that the beds be excavated to a depth of three feet. This is unnecessary especially for Hybrid Teas and Perpetuals. The root system of these seldom extends more than eighteen inches. Ramblers, Sweetbriars, etc., seem to make a more luxuriant growth and give finer flowers in deeply prepared soil.

There are two sets of conditions when deep excavation is of decided benefit. In locations where the soil is very heavy and drainage naturally poor, a deep bed with a foot or more of stone or clinkers in the bottom and eighteen inches of good, porous soil above gives the best results. With a

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very compact and heavy clay soil it is necessary to lay a line of land tile connecting a series of beds, provision of course being made to care for the surplus water. If the tile be connected to the house or city sewerage system, see to it that there is a trap between the sewer line and the garden. If



Cross section of well prepared Rose Bed.

this precaution is not taken the plants are liable to be injured by the sewer gas.

The other condition which calls for deep excavation is a light porous soil or an arid section of the country. In either case, two and a half to three feet is not too deep. Use turf, and manure, well mixed, in equal parts to fill the bottom half. The upper half should contain about eighteen inches of

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good soil. A mixture of sod and manure will retain the moisture for a long time and lessen the need of watering.

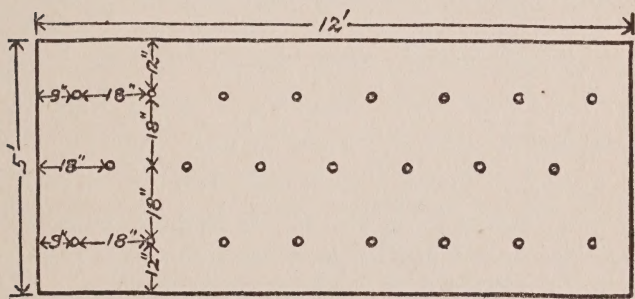
A plan of the cross section of a rose bed is given. This is for average conditions and should be varied to meet special requirements as suggested above.

Where drainage is not essential and the soil is of good character, excavation is not required. The soil should be turned to a depth of one and one half feet. The subsoil is generally discarded and well rotted manure used to make up this loss of volume. Bone meal at the rate of one ounce to the cubic foot is sometimes added. The whole is turned over several times until the various ingredients are thoroughly mixed. Many consider it less laborious to remove all the earth from the beds and to fill with prepared soil from the outside.

The shape of the beds is chiefly a matter of taste but a study of the location will assist in the decision. Wide beds should always be avoided. Five feet in width should be the maximum. The essential thing is that every plant may be reached without stepping on the bed. The number of rows of

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plants desired is one of the determining factors in estimating the width. It is poor policy to plant the outside row of bushes closer than nine inches from the edge. A bed five feet wide allows for three rows of plants eighteen inches apart. The outside rows in this case are twelve inches from the edge. Most Teas, Hybrid Teas and

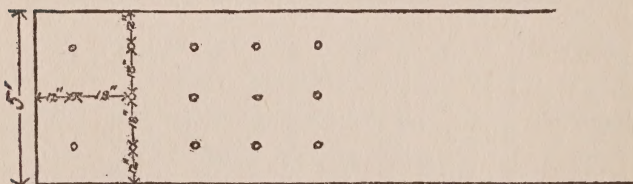


This plan allows more light to reach the center row. The entire surface of the bed is shaded by the foliage.

Hybrid Perpetuals should be planted not closer than eighteen inches both ways. Some of the stronger growing varieties require from twenty to twenty-four inches. Beds three and one half feet wide are preferred by some growers. They contain two rows of plants. Sometimes a single row of bushes will occupy a bed two feet wide. This

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style of planting, of course, allows free access of sun and air on all sides of the plant and is claimed by many to be the best method. The objection to this system is that too much space is wasted. Except when roses are planted along borders it is best not to have the beds too long. Short beds eliminate the tendency to cross instead of going around. A bed four and one half



The simplest and perhaps the best arrangement. There is less chance of injury during cultivation.

or five by thirteen feet will hold twenty-four plants.

The walks in the garden should be wide enough to permit the use of a wheelbarrow without chance of injury to the plants. Narrow paths frequently result in torn clothing. Wherever it is possible to maintain a sod, the walks should be of grass. A well-kept lawn in a rose garden adds much to the beauty of the picture. When planning

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large gardens it is best to do what grading may be necessary and get the lawn started the year before the bushes are planted. If the grass seed is sown after the plants are set out much time will be required to free the bed from it. The edges of turf walks will, of course, require an occasional trimming.

When preparing a bed for roses it is generally better to have the surface soil at least two inches higher than the surrounding lawn. There is always considerable settling which occurs after the beds have been filled and it is much easier to have the required amount of soil in the beds before planting than to fill in after the plants are set out. At the end of the first season the surface of the bed should be at the same level as the lawn.

When the surface of the bed is lower than the surrounding soil the water is likely to collect around the plants and if much higher the roots may be injured by excessive drying.

CHAPTER II

PLANTS AND PLANTING

One of the questions which confronts the beginner is the kind of plants to buy. Shall they be budded or own root?* Dormant or potted? On the proper answer to this question rests his success.

It is generally conceded that budded roses are the most successful. There may be some sections where the own-root plants will do as well. This of course refers to the Hybrid Teas and more or less to the Hybrid Perpetuals. Many of the latter are strong growers and frequently do well on their own roots. The climbers, Rugosas, etc., are very seldom budded.

Having decided on budded plants the next question is what sort of stock? The best all around stock today is Multiflora Japonica. This should be seedling stock and not from cuttings. Stock from cuttings is inclined to sucker badly. On a light, gravelly soil *R. canina* (dog briar) often

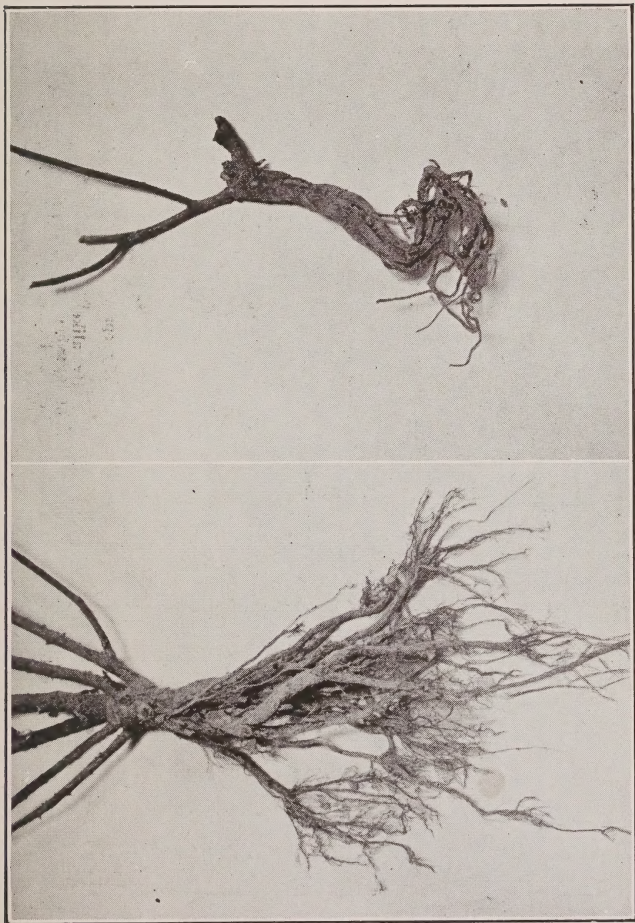
*For explanation of these terms, see page 82.

gives excellent results. *R. rugosa* is sometimes used but it is inclined to sucker and if these shoots are not removed at once the bud soon dies. Manetti as a stock for garden roses is generally disliked. It does not live very long when planted out. It makes a strong growth for three and sometimes four years, deteriorating rapidly after that. Another objection to Manetti is its long growing season. In the milder sections of the country this feature would not be considered a fault. Where early maturity is desired, as in the northern latitudes, this is a serious fault, being the chief cause of winterkilling.

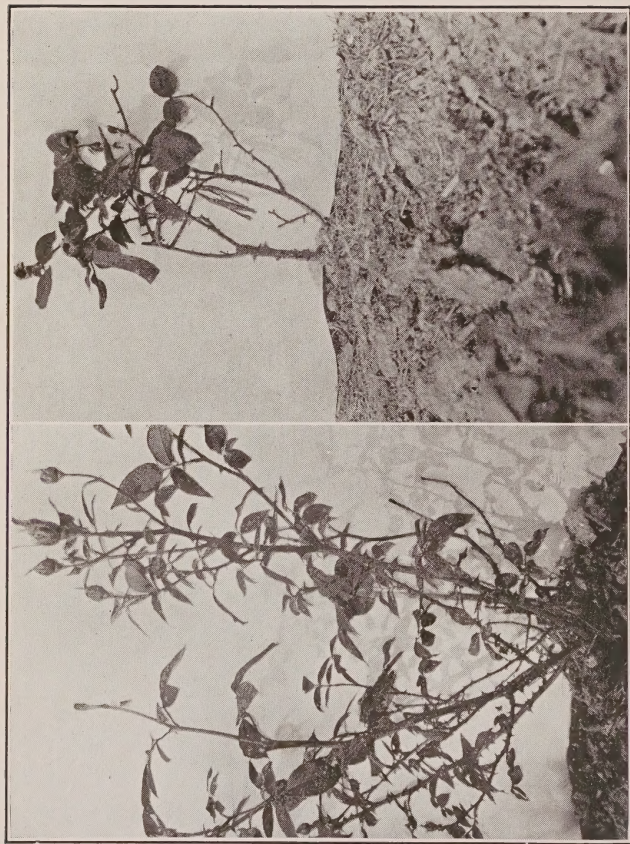
Now as to dormant or potted plants. It must be understood that the term "potted" or "pot grown" does not mean that the plants have been grown to their present size in pots. Many of the "potted" roses are grown in the following manner: In late March or April the grafts are made, using Manetti as a stock. As soon as the plants are large enough, usually in June, they are planted in a bench in the greenhouse. They are planted closely—too close for good root action—as greenhouse space is valuable.

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Every effort is made to get as much growth as is possible. In many instances the plants are allowed to bloom. This is wrong as the strength of the plant, instead of forming new branches is utilized in perfecting the flower. These flowers are, of course, sold and reduce the expense of producing the plant. A young plant for garden use should never be allowed to perfect more than two or three flowers—these simply to prove the variety true to name as there is some chance of mixture when a quantity of plants is handled. In the fall the young plants are allowed to become dormant, after which they are lifted and either potted at once or stored in a cool place and potted later. In any case they are potted and brought into growth before being sold. Furthermore these are sometimes sold as two year old field grown plants. Naturally the growth under greenhouse conditions is greater than that made in the nursery. It frequently occurs that plants of this sort are as large at the end of a season as a two year old field-grown plant,—that is, the top is as large. The root system of the bench grown plant is very much inferior to that of the



Left. A two years' old field grown rose plant. This is the type of root system which is bound to produce flowers. Note the numerous feeding roots. The stock is *Multiflora Japonica*.
Right. The root system of a greenhouse grown plant grafted on Mannetti. This plant was in the garden eighteen months and almost no fibrous roots were developed. The curled position of the roots is due to being crowded into a small pot. Two or three years in the garden will not eliminate this cramped condition.



Left. A strong argument for fall planting where early spring work is impossible owing to either soil or climatic conditions.

Right. Two plants of Viscountess Folkestone exactly alike in the fall when received. The one on the left was planted the third week of October. The other was heeled in and held in dormant condition until the fifteenth of May. All care possible was given it after planting. The photographs were made August twentieth.

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field grown. It is well to remember that *the root system is the business end of any plant, and no amount of top will compensate for a lack of roots.*

When purchasing dormant plants one has the opportunity of examining the roots and if not satisfactory they may be returned. With the potted rose only the small soft feeding roots are visible, and if these are disturbed the growth of the plant is checked. Not all "pot grown" roses are of this type. Sometimes they are lifted from the field at one year old and potted. These are better than the bench grown stuff. Occasionally the two year old field grown plants are potted and carried along to fill late orders. If this type of plant can be obtained there is not much danger of disappointment. Plants handled in this manner are, of course, more expensive than the dormant ones. The purchaser is also paying transportation charges on a quantity of soil.

A glance at the illustrations will clearly show why two year old field grown plants on Multiflora stock are advocated.

In the more northern latitudes where there is almost no intermediate period be-

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tween the cold wet springs and hot, dry summers, spring planting is frequently unsatisfactory. This is particularly true with heavy soils. Where soil or weather conditions will not permit planting until late April or early May, fall planting is advisable. Many rosarians would rather plant dormant roses in late October or November than at any other time.

There are several reasons for planting at this season. When ordering in the fall one is more likely to procure stronger plants as they come directly from the field and have had no unnecessary handling. In the spring, unless ordered very early one often has to accept the "left-overs" which are always of poor quality. Even though ordered early they must frequently be left in the package or heeled in until the soil is in condition to receive them.

As a rule it is impossible to procure dormant plants after the first of May. When they are obtained later than this they are not very satisfactory since they require a great deal of attention. Even with the best of care many of them will die. It is the hot sun and drying winds which cause the

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greatest loss in late spring planting. Plants that are set out late in the season must be sprayed several times a day with clear water. This spraying prevents the bark from shriveling and should be continued until the eyes have developed. It is usually necessary to shade the plants in some manner for at least two weeks after planting. All this labor may be eliminated by planting in the fall because the wood is ripe and there is no action in the tops. When planted in the fall the soil becomes firmly settled around the roots and some root action—more than is realized—takes place before the ground freezes. In other words, the plant becomes better established before starting its work of producing flowers in the spring. Unless planted very early in the season, spring planting causes double work for a plant, since it is then necessary for it to make roots as well as to produce flowers. Consequently a plant set out in the fall having its root system well established by the time flowering season arrives may direct all its energy towards producing blooms. This means flowers of better quality.

Another point in favor of fall planting

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is the fact that as soon as growth starts in the spring the plants may be fed with manures or commercial fertilizers. With spring planting, a month or six weeks must elapse before it is safe to attempt to force growth by feeding. Since it is more advantageous to produce growth in the spring for summer flowering rather than in the summer for later blooming it will be seen that fall planting is of decided benefit. For late spring or summer planting where an immediate effect is desired, the potted plant is the only choice. As stated elsewhere, these as a rule, are not satisfactory for permanent results.

The beds to receive the plants should be prepared some time in advance. If it is intended to plant in the spring the beds should be made ready the preceding fall. When fall planting is contemplated it is best to prepare the site not later than August. Early preparation allows the soil to settle and seems to give better results.

When the plants arrive, unpack and plant at once, if possible. If the weather conditions do not permit immediate planting, heel in the plants where the sun and wind will not affect them. If the weather is cold

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do not allow the frost to strike the plants. It sometimes happens that the bark is shrivelled. This may be due to poor packing, being near a steam pipe, or too long a time in transit. When only a few plants are thus affected, soaking them for a few hours in water and then burying in moist soil for three or four days will usually restore them. If the entire shipment is shrivelled complain at once to the transportation company, write to the nurseryman stating the condition of the plants and return them to him. In most cases the plants will be replaced. It is the nurseryman's desire to have satisfied customers.

A cool, cloudy day is the ideal time to plant but do not wait too long for such conditions. Plant as soon as possible. Examine each plant carefully and cut off all broken roots and branches. Use a sharp knife for this. Having the beds properly marked and spaced before planting will greatly facilitate the work.

The most important step in planting roses is to dig the hole large enough. It must be of such size that it will allow the spreading of the roots without crossing. The more

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the roots are spread the more nourishment the plant will receive as there is more room for the small fibrous feeding roots. The depth of the hole will be governed by the size of the roots and the kind of stock. Roses on Briar, Manetti or Rugosa stock must be planted so that the union is not more than three inches nor less than two inches below the finished surface of the bed. Multiflora stocks should be one and one half inches below the soil level. This seems like very exact planting directions but if the bud is higher it will not be sufficiently protected during the winter. If planted deeper the rose does not thrive. For own-root roses, plant just below the former level.

After the hole is dug, place the plant in it and spread out the roots so that they do not touch or cross one another at any point. Do not try to hurry the job. Remember that a planting of roses is a more or less permanent thing and its success depends upon the care used at this time. Two persons can do the work much better than one. When planting, have a pail or box containing good

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fine topsoil and well rotted manure in equal parts to sprinkle in the bottom of the hole and on the roots. Equal parts of soil and finely ground bone meal are sometimes used. Never allow fresh manures to come in contact with the roots. Put in the soil a little at a time and tamp it firmly. A piece of wood about two feet long and two inches in diameter makes an ideal tamp. *Don't be afraid to use it.*

Be sure there are no air spaces left around the roots, particularly around the main root of the plant. When the hole is filled to within two inches of the top is the time to water if any watering is necessary. When the water has soaked into the earth fill the remainder of the hole with loose soil. *Never tamp the surface soil.* A compact topsoil means rapid evaporation.

If planting cannot be finished in one day take care of the balance of the plants. Keep them heeled in or covered with moss, damp straw or leaves. Never take more plants to the garden than can be planted at once. Do everything possible to prevent the roots from drying. A box with a layer of damp

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moss on the bottom and some canvas or burlap over the top makes a convenient carrier for the bushes when planting.

When planting is done in the spring it is a good plan to give the beds a two or three inch mulch of "spent" manure or other material containing little or no plant food. A mulch is not always necessary but in the warmer sections and on light porous soils it is a decided help.

Except when large quantities of a variety are ordered, each rose bush has a label bearing its name attached to it when it leaves the nurseryman. See to it that each plant is properly labeled when it is set out. After the planting is completed make a chart showing the exact location of each plant. This is most necessary as the labels are easily lost and without a planting key it is difficult to observe the different varieties accurately. A cheap, practical label can be made as follows: Give a wooden label a thin coat of white lead paint. While the paint is fresh write on the label with a soft pencil. When the white lead is thoroughly dry the label is given a covering of spar varnish or white shellac.

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When moving a rose bush from one position to another place in the garden be sure that the plant is dormant. Early spring before growth starts and during the autumn when the leaves have fallen are the only periods when the plants should be disturbed. Spading forks should be used when removing soil from around the roots as there is less danger of injury. A well established rose plant has a very large root system and considerable digging is necessary if the plant is to be successfully moved. When a plant is thus moved always cut off at least one half of the top. This is to balance the loss of roots which is bound to occur no matter how carefully the plant is lifted.

Ramblers, Rugosas and other large growing species should always be given a support when newly planted. At the end of the first season after the plants are established, this support may be removed if desired.

Most nurserymen send out plants which are properly pruned. This is always true of plants received in the spring. Those shipped in the fall sometimes are not

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pruned. When such plants are obtained, cut back one half their growth when planting. This will prevent the wind from working them loose before the ground freezes. The pruning proper is delayed until the following spring.

Don't expect first class results from cheap plants. Low priced plants are generally the most costly in the end. The plants sold by department and ten-cent stores are frequently culls and should not be purchased. Plants of this type are almost never properly labeled and consequently cause much disappointment.

Purchase your plants from some good nurseryman—preferably a rose specialist. They know how to produce good plants and also how to pack and ship them.

Order from the nearest good growers. The nearby nurseryman will in all probability carry varieties which are most suitable for your locality and will be in a position to give advice and suggestions.

CHAPTER III

SOILS AND FERTILIZERS

The various rose species have slightly different soil requirements. An ideal soil for the Teas and Hybrid Teas is a deep, rich friable loam which contains from twenty to forty percent clay. Hybrid Perpetuals, Rugosas, Wichuraianas and other strong growing types seem to thrive best in a soil that has a much higher clay content. A seventy percent clay soil will give excellent results if the drainage is good. In fact roses may be grown in almost any soil, provided there be a plentiful supply of plant food and good drainage. *Drainage* is the determining factor in selecting a rose soil. On a poorly drained soil the movement of the water is so slow that the plants do not receive sufficient food. The aeration on waterlogged soil is always poor, consequently there is but little root action and little nitrification. Even a poor soil can be made to produce good flowers if properly managed. A very stiff clay is made more friable by the addition of lime and strawy manure.

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Perhaps the most satisfactory method of soil preparation is the compost pile. Sod from an old pasture is ideal if it can be obtained. If turf cannot be secured, good top soil can be used but of course this is frequently lacking in fibre. The turf should be cut three to four inches thick and placed grass side down. The layer of sod should be about one foot deep. This is followed by a four inch layer of manure and so on, alternating sod and manure until the required amount has been laid up.

Bone meal is sometimes added to this—a heavy dusting of coarse ground bone being applied to the layer of sod before the manure is put on. While in many cases this is of benefit, it is not necessary. Do not make the soil too rich at the beginning because much of the nourishment leaches away before the roots are in condition to absorb it. It is better to supply the plants with food as they require it than to try to store up enough in the soil for an entire season. Plants, like humans, are made ill when supplied with too much rich food when they are not active.

When the turf is dry it should be given

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a watering as each layer is added. Watering at this time helps decomposition and also prevents stable manure—if it is used—from “burning.” A compost pile should always be turned over and mixed at least twice before using. *The more thoroughly any soil is mixed the better the results.*

At the second turning lime may be added if so desired. While lime in itself is not a fertilizer it has the power to liberate some of the elements of plant food which are in the soil. In many cases lime improves the physical condition of soils, which is most important. A stiff clay soil is made more porous and mellow when lime is added. The effect of lime on light sandy soils is to make them more retentive of moisture. Whether the rose requires lime in the soil is a question open to discussion. Many varieties seem to do better on a slightly acid or sour soil. The “blueing” of red roses is frequently due to an alkaline soil. Generally, deep pink and red varieties have better and more lasting color when grown on slightly acid soil. The Pernetiana group, especially those showing strong briar characteristics, should not be grown

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on a sour soil. They seem to do better under neutral or slightly alkaline conditions.

The three elements of plant food in which most soils are deficient are nitrogen, phosphorus and potassium.

Nitrogen is a stimulant causing a rapid succulent growth. It must be carefully used. Plants that are not making a sufficient growth or are showing a light yellowish green foliage indicate the need of nitrogen. Nitrate of soda contains a high percentage of readily available nitrogen and its use is recommended. It must be remembered that all plant food which is absorbed by the roots must be in solution. This is why plants respond more quickly to liquid fertilizers than to dry manures. Best results are obtained by dissolving three ounces of nitrate of soda in five gallons of water. This amount of solution should cover thirty to thirty-five square feet of bed. One application a week for three weeks will give the plants a decided start.

Dried blood and tankage are two other materials which contain relatively large amounts of nitrogen. These are perhaps safer to use than nitrate of soda but as the

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nitrogen is not so readily available the plants do not respond as quickly.

Phosphorus gives color to flowers and fruit and stimulates flower and seed production. It also strengthens the cell walls. Consequently it is the element upon which the gardener must rely if he would have flowers of good color and substance. The two most common sources of phosphorus are bone meal and acid phosphate. Phosphorus from any source is not so available for plant food as is the nitrogen in nitrate of soda. For this reason phosphatic fertilizers should be applied early in the growing season if the full benefits are to be obtained. If bone meal is used, a pound should cover twenty-five square feet and about half that amount to the same area if acid phosphate is used. When applying any of the chemical fertilizers in dry form it is always best to work them into the soil with a small rake and then give the bed a watering.

Potassium gives strength to the cell walls and rich green color to the foliage. It is a well established fact that plants growing in a soil well supplied with potash are always

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healthy and better able to withstand fungus diseases than those in soil containing a less amount. Heavy clay soils are usually rich in potash, and roses in such soil are more or less immune from mildew. Some growers go so far as to claim that mildew can be effectively controlled by regulating the amount of potash. At any rate plants of the same variety in the same gardens given a handful of potassium sulphate were not attacked by the fungus while those not treated were badly infected. This instance is cited to show that the importance of potash cannot be overlooked. Unleached wood ashes are an excellent source of potash. They also contain some lime which is often of benefit. On average soils an ounce and a half or two ounces twice a season should keep the plants in good health. If the soil be very light heavier applications may be used. Potassium sulphate is generally used at the rate of a small handful to a plant. A solution made from one tablespoonful of potassium sulphate dissolved in four gallons of water is perhaps the better way of supplying the potash. This should be ap-

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plied every week or ten days during the growing season.

The suggestions offered above are general. Each grower must solve his feeding problem for himself. It is impossible to give any definite rules governing the use of fertilizers. Oftentimes a lack of growth is caused by the physical condition rather than the chemical composition of the soil. Some soils require more of one element than of others. Do a little experimenting and go slowly. It does not always follow that, "If a little is good, more is better."

There is on the market at present a special rose fertilizer which is composed of the three most important elements and various other plant foods. The use of a complete fertilizer of course means much less bother than when three or four are used at different intervals. These rose-foods may not be suited to all conditions but it is advisable to try some of them.

Animal manures, without doubt, furnish us excellent rose fertilizers. They not only supply actual plant foods but also keep the soil in such condition as to make the natural

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food supply more available. As a rule the decomposed manures are the best since they contain a greater percentage of soluble organic matter. The fresh manures contain more carbon and water. In well managed fermentation the amounts of nitrogen, potash and phosphoric acid are the same as in the fresh. The rotted manures are much more easily handled.

For use on most soils cow manure is the best of the animal fertilizers. Where a garden is composed of heavy clay the horse manure will give better results. The water content of the cow manure, being much greater than that of horse, causes the clay to become like paste. When tilled or worked in this sticky condition lumps are formed which soon dry out and bake very hard. It is almost impossible to pulverize these during an entire season. A rough, lumpy surface in a rose bed is to be avoided. The horse manure on the other hand tends to break up the compactness of the clay causing it to become more friable. Except on very light soils, sheep manure may be used with good results. This is as a rule

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quite strong and should not be used as freely as the others.

Animal manures are applied either as a mulch or in liquid form. When used as a mulch, a two inch coat is about the right amount for cow and horse manures. A one inch covering of the sheep manure is sufficient. The liquids are made by using one half bushel of manure to one barrel of water. Allow to soak for about twenty-four hours and use. It is best when made fresh each time. Five gallons of the solution should cover about thirty-five square feet. If sheep manure is used one half of the amount of material to the same amount of water will make a strong fertilizer. Some of the best growers use liquids entirely, feeding once a week during the periods of growth but *withholding it from the time the buds begin to open until the growth starts again*. Cow and sheep manures may now be purchased in dry pulverized form. They are more easily stored and much pleasanter to use than the natural manures. Care should be taken, however, not to use too much as they seem more concentrated.

The earth should always be moist before

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any manures or fertilizers are applied. Best results are obtained by watering before and immediately after feeding.

There are several "don'ts" which must be observed when fertilizing roses. They are as follows:

Don't feed unless the plant is in active growth.

Don't overfeed at any one time.

Don't feed unless the soil is moist. The soil must be damp when using either chemical fertilizer or fresh or partly decomposed manures, otherwise the feeding rootlets will be injured and the plant growth checked rather than promoted.

Don't feed later than the first of August. To do so means unripened wood in the fall.

CHAPTER IV

THE SUMMER ROUTINE

The success of a rose garden depends on the care it receives. Careful planting, adequate winter protection and proper pruning are of no avail if the summer work be neglected. To be sure, most of the hard work is over after the plants have been pruned. It is during the summer that we reap the benefits of our labors. There is always something to be done if we would have the finest blooms which the plants are capable of producing.

With the development of the leaves comes the need of disease and insect controls. When the first leaves are fully formed a dusting of the sulphur-arsenate mixture should be given. The addition of one part of dusting tobacco will prevent the green flies from becoming established. Using the fungicide at this season prevents infection from the spores which have lived over winter in the soil.

As the branches develop and the general growth of the plant becomes more active,

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more food will be required. If the growth is somewhat slower than usual and the soil and climatic conditions are good, an application of nitrate of soda will give the plants a decided start. Two ounces of nitrate of soda dissolved in five gallons of water is about the right strength. This amount of solution should cover thirty to thirty-five square feet of bed surface. A second application may be given in ten days if the plants still seem sluggish. Do not use nitrogenous fertilizers after the flower buds begin to develop.

Generally speaking, an application of any fertilizer containing a large amount of available nitrogen, should be followed by the use of potash and phosphoric acid. These two plant foods give strength to the cell walls and stimulate flower production respectively. The idea is to *promote growth* by the nitrogen, *harden that growth* with potash and *aid the flower development* by the phosphoric acid. During the flowering period no extra food should be given. In fact, the plants require a slight rest after they have produced a crop of flowers.

Many of the Hybrid Tea varieties, in-

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stead of sending out one terminal bud on a shoot, develop a cluster of buds. The central bud of this cluster is generally the best and is the only one which should be allowed to perfect its flower. Remove the lateral buds as soon as they can be seen. Otherwise they will rob the best bud of its nourishment. Dis-budding should be attended to regularly.

Constant stirring of the surface soil will keep down the weeds and promote root action. A small rake makes a good implement for this work. Never allow a crust to form on the beds. If possible loosen the soil twice a week. Use care in this operation—deep scarifying means root injury. All foliage which shows signs of black spots should be removed and *burned* at this time. Allow no leaves to remain on the beds.

After the plants have produced their first crop of flowers, and before the second period of growth starts is the time when the suckers—strong shoots from the stock—make their first appearance. The plants should be carefully gone over and any strong new growth which comes from below the soil level should be regarded with

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suspicion. There are several ways in which the suckers may be distinguished from the variety. The surest procedure is to carefully remove the soil from around the base of the suspected "wilding" and trace it to its starting point. If it comes from below the union it is a sucker from the stock and must be removed. Use a sharp knife for this and make an upward cut. Cut as close to the stock as possible, removing a portion of the bark at the base of the sucker. The bark at the base of a shoot frequently contains dormant buds which would develop if not removed. Thorough suckering at this time frequently prevents further trouble. Always be on the lookout for wild growth, especially at the periods between crops. Canes from the stock usually bear leaves which have from seven to nine leaflets while the leaves of the budded variety are generally made up of three or five leaflets. Color of the foliage and arrangement of the thorns are other means that indicate "wild growth."

When the plants have gotten well started into their second period of growth a mulch may be put on. Well rotted cow or horse

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manure is good. Some growers prefer peat moss and still others recommend lawn clippings. As roses are gross feeders, the rotted manures would seem to be the best material. A mulch two or three inches deep conserves moisture,—which is the main reason for its use,—keeps down the weeds, and also furnishes some plant food. Thorough watering of the beds is advisable before applying a mulch. On heavy soils and with a wet season a mulch should not be used.

One of the most important phases of the summer's work is the proper method of cutting the flowers. A flower should not be left on the plant until its petals fall. Cut it off so that the energy may go into other flowering shoots. When a bloom is removed it should be cut back to within two inches of the branch that bears the flower stem. This usually leaves two good eyes which will in about four weeks produce more flowers. Cutting in this manner may seem like a waste of wood but there are several reasons for cutting so hard.

First: Bear in mind the pruning axiom that the quality of the bloom is always in proportion to the strength of the stem that

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carries it, and the strength of that stem is in proportion to its proximity to the base of the plant.

Second: By cutting low, one is enabled to build up a well branched plant which will give more flowers of better quality than one which is allowed to make a tall scraggly growth of light wood.

Third: In many localities the latter part of June and July are very hot and dry. What few blooms are produced at this time are always of inferior quality even though the growth be fairly strong.

It is admitted that by cutting low one tends to check the continuity of bloom. On the other hand it must be borne in mind that the shoots do not all flower at the same time so that even when cut back to two eyes a succession of bloom will be the result. The slight check in the continuity of bloom is more than offset by causing new growth to be made during the hot, dry weather. When the nights grow cooler this new wood is ready to produce flowers of excellent quality.

A rose to be used as a cut flower should always be cut just as the outer petals start

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to unfold. Early morning, while the wood is cool and firm is the time the flowers should be gathered. After the intense sun has been shining upon the plant for a few hours the flowers start to fade and the stems become somewhat wilted.

Oftentimes roses are arranged in containers as soon as they are cut. This is a poor practice. Careful experiments have shown that if, immediately after being cut, roses be plunged into deep, cool water—almost to the flowers—and placed in an ice-box or cool cellar for eight to ten hours or more they will keep in perfect condition much longer. Frequently a rose treated in this manner will develop to larger size than if left on the plant.

Many of the best rosarians practise what is called summer pruning. This simply means that the smaller twigs and branches, especially those in the center of the plant are removed or are not allowed to develop. Cutting the flowers as suggested above is in itself a mild pruning. Plants thus treated frequently require little pruning the following spring other than cutting back the heavier canes.

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During a warm moist summer when the growth is luxuriant it will be necessary to support the heavy new canes which come from the crown. Bamboo stakes which are dyed green may be procured from any seed store. These are inconspicuous, cheap, easily used and give good support. Soft woollen string or raffia is the best tying material. The string is first fastened to the stake so that it will not slip and then the shoot is tied rather loosely. Tying must be done in such a manner that growth is not restricted in any way.

From the middle of August until early September when the days are hot and nights cool is a trying time for the rose foliage. The careful grower daily inspects his plants for the first signs of mildew. If he has adopted the precautionary measure of dusting regularly every ten days he knows that his plants will come safely through this dangerous season.

This question is often asked: "Should a rose garden be watered?" If answered either in the negative or affirmative it will not apply to all cases. In gardens where the beds have been prepared according to

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directions elsewhere outlined and where there is the usual amount of precipitation, watering is not necessary. There are times when any garden is benefited by a heavy watering. Do not be alarmed at the first dry spell. There is a greater amount of moisture in the soil than most of us realize and the roots will find it. During a prolonged drought it will be necessary to water. All watering should be done early in the day so that the foliage is dry at night. The gardener who allows his plants to go to sleep with their leaves wet is inviting trouble. When water is given do not be afraid to use it. Put on enough so that the soil is moist to a depth of fifteen to eighteen inches. *Above all things don't everlastingly sprinkle the surface.* Constant surface wetting during the summer means ruin. The roots are drawn to the moist upper layer of soil and then cooked by the sun.

Generally, good results are obtained when the use of the hose is limited to syringing. Red spiders are easily controlled and other insects are discouraged by being washed off with a strong stream of water. Rose plants which are frequently syringed

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always seem to be in better condition than those which are not. Syringing, when properly done, does not get much water on the soil. This of course must be done early in the day.

As the season progresses and the weather becomes more settled, an improvement in the quality of the flowers will be noticed. In fact, some of the very best flowers are produced in the autumn. Even in the northern latitudes it is not uncommon to cut some excellent blooms during early October.

If the climatic conditions are unseasonably mild and there is danger of the wood's remaining succulent late in the year, make every effort to aid its maturity. Varieties that are known to be tender should have the loose top soil removed. If there is any of the mulch remaining, that also should be taken away. The tips of the branches may be cut back, thus preventing further growth.

The tall canes of the Hybrid Perpetuals may be cut back about one half their height. This will prevent the wind from working them loose.

Thus the garden is gradually prepared for the winter.

CHAPTER V

WINTER PROTECTION

Many rose lovers of the northern latitudes fail to derive the utmost pleasure from their gardens because they do not plant the Hybrid Tea varieties, fearing that they will be killed by the severe winters. It is true that many of the Hybrid Teas will freeze to within a few inches of the ground, but most of them, with the proper protection, will bloom profusely from year to year.

It is the common impression that protection is to keep the plants warm. This is indeed far from correct. The main object in covering the plants is to keep them *cold*—that is, to prevent thawing and freezing during the warm spells in winter. The usual “January thaw,” and the warm south winds of late February and March, followed by sudden drops in temperature are the times when most of the injury occurs. If the plants could be frozen the early part of December and remain in that condition until the last of March there would be no

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need of covering. In localities where the snows come early and remain until late March, no protection is necessary.

To secure the best results the covering must be done as late in the season as possible. Early protection, especially if the material used is damp, often causes the plants to start growth. This growth is of course killed when severe weather arrives, and results in a great loss of vitality. Most satisfactory results are obtained by covering just before the ground becomes solidly frozen. Two or three sharp freezes do more to insure the proper wintering of the plants than any amount of early protection.

The first requisite in carrying the plants through the winter is having the wood thoroughly ripened. Canes that are full of sap when cold weather comes will not survive even a mild winter. The freezing of the sap causes expansion which bursts the outer bark and leaves the wood exposed to the weather.

There are several ways in which one may hasten, or at least aid, the ripening process. The question of drainage is of most importance. On a heavy, water-logged soil,

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growth is continued until late in the season. Therefore look to your drainage.

Keep the food away from the plants so that no more growth will take place after the first of October. If the last feeding or mulch be applied not later than the middle of July there will be little danger of immature wood. Cultivation should be discontinued after the last of August. Working the soil later than this tends to stimulate growth which is undesirable at this time of year. If the weeds grow, pull them, but do not use a hoe.

There is still another method which has proved beneficial in ripening the wood of ramblers, tall growing Hybrid Perpetuals and other large species. After the first light frosts, cut back about one foot of growth from each cane. This prevents further growth at the tip and causes the eyes to develop. The development of the eyes utilizes the sap in the canes and there is little danger of immature wood.

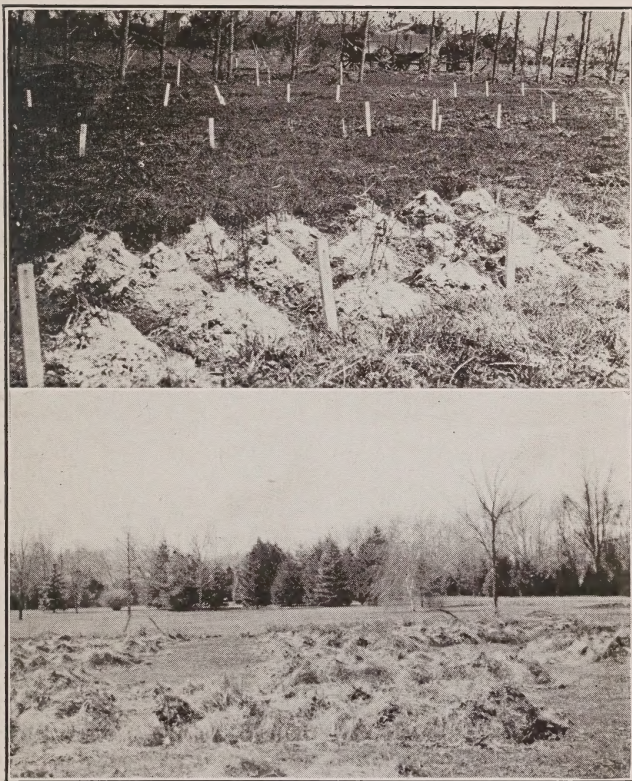
Now as to actual methods of protection, one of the common methods is to completely cover the plants with straw. The canes should be drawn together and tied in two

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or three places according to their height. Soil is then thrown against the base to a depth of three or four inches. The plant is now ready for the straw. Long rye straw is the best, although it is hard to procure, as most of the grain today is threshed by machines which break the straw into short lengths. If long straw is used it is simply placed upright against the plant to a thickness of three or four inches and securely tied, especially at the top and bottom. More soil should be thrown against the base to a height of six or seven inches. This will keep the water from collecting around the plant and also keep out the field mice. In using short straw the plant is practically buried with it and a vegetable hamper or box inverted over the whole. Sometimes burlap is used in place of boxes.

Another method of covering is to surround the bed with chicken wire about one foot high and then bury the plants with leaves or straw. A few sticks or branches over the top will prevent the covering from blowing off. This is a very good practice where the winters are moderate.

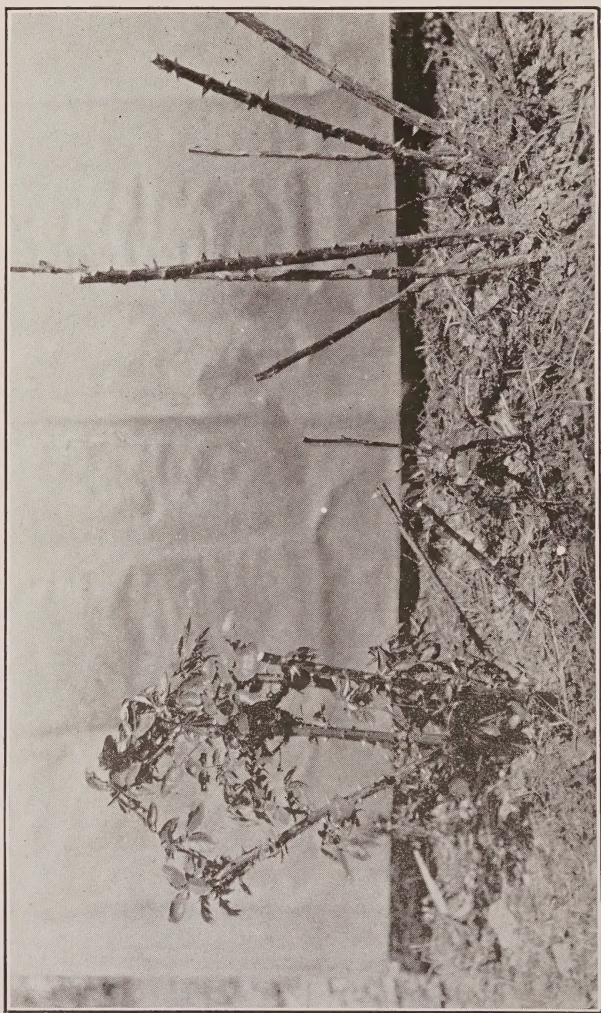
The most satisfactory results are obtained



Upper. A bed of Hybrid Teas mounded with dry soil.

Lower. When the frost has penetrated to a depth of five or six inches a heavy covering of straw, leaves or strawy manure is added.

The background planting is representative of an ideal windbreak.



This is what happens when water collects around the crown of a plant. Both were covered with barrels. The one on the left was first mounded with soil and then surrounded with hay. The other was simply covered with hay, no earth being thrown against the base.

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when the plants are protected in the following manner: About the first of November the several canes are tied together. Then after the ground has frozen several times, softened up, and is *dry*, the plants are mounded up to a height of ten or twelve inches. The soil must be dry because wet earth against the canes means decay. See that the center of the plant is well filled with soil so that no pockets to hold water will be formed. Care should be taken, however, not to dig too deeply for, by so doing, the roots are apt to suffer. For this system of protection the plants should be set not less than eighteen inches apart and twenty to twenty-two inches is better, if space is available. Soil for the mounding may be brought in from the outside but this means unnecessary labor. After the mounds have become thoroughly frozen, that is, when the frost has penetrated to a depth of five or six inches, the entire bed is covered with old stable manure or leaves. This covering should be ten or twelve inches deep, its object being primarily to hold the frost in the soil around the plants. It serves as a covering for the roots from which the

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earth was partially removed and also collects much of the water which might otherwise gather in the depressions between the mounds.

The success of this method depends upon the following factors:

1. The work must be done as *late* as possible.
2. The soil must be *dry*.
3. The mounds must be *thoroughly frozen*.

A more expensive but very satisfactory way of carrying plants over the winter is to use wooden shutters. The space between the plants is first filled with dry straw or leaves, and then the temporary roof is put over the entire bed. This is of course impracticable in the ordinary garden.

In the colder sections the Tea roses are not very satisfactory on account of their tenderness. The surest way of bringing them through the winter is to lift carefully and heel them in in a cold frame. This is best done after the middle of November. The roots and one half the length of their canes should be covered at least a foot deep with dry soil. This in turn should have a

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heavy coating of straw or leaves and the whole covered with wooden shutters. The shutters should not form an air tight covering. Some space must be left for ventilation, otherwise the plants will mould.

The protection of ramblers is governed to a certain extent by their location. In the mild sections of the country often no protection is given. As a rule a rambler will give more and better flowers if some kind of covering is provided. If located in a well sheltered garden evergreen branches placed on the sunny side will give ample protection.

Farther north a more careful covering is advisable. In November when the canes are thoroughly ripened they should be cut loose from their supports, and tied together, forming long bundles. These bundles are buried just before winter sets in. Usually cover the ramblers after the bush roses are protected. The same rule applies here as to the other types of roses. Wait until the ground has been frozen several times and then bury with dry soil next to the canes. Building paper is sometimes used to prevent the wood's coming in contact with wet

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soil. The term "bury" as used here does not mean that a trench should be dug. On the contrary, avoid any depression in which water may stand. Water around the canes means dead wood in the spring. Lay the bundles of canes straight out upon the ground and pin them down with wires or wooden pegs. If on a sloping site, lay the tips lower than the crown of the plant, thereby eliminating any chance of water collecting at the base. Now remove the soil from both sides of the bundles and use it in covering. This leaves the canes on a ridge of ground so that the water may drain off on either side. Use plenty of soil around the crown. After the soil is solidly frozen, a covering of manure eight or ten inches deep is given. This method has proved one hundred percent efficient.

Carrying standards or tree roses over winter is always a problem. If there are but a few plants they may be treated in the same manner as described for the teas. That is in all probability the surest, but requires time and space. Good results are usually obtained by digging the soil away from three sides of the roots and bending the

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standard over on the fourth side. If care is used in the operation no injury will occur. The entire plant is then covered the same as the ramblers.

Rose gardens located in the country, or adjoining large areas of turf or stubble, are frequently badly damaged by field mice during the winter. The simplest manner of combating these pests is as follows: Dissolve one ounce of strychnine or cyanide of sodium in one gallon of water. Allow wheat to soak from twelve to fifteen hours in the solution. Two or three handfuls of this poisoned grain on each bed will prevent injury to the plants and frequently rid the neighborhood of these rodents for a season.

In the spring the removal of the covering should be accomplished in three different operations:

First: About the middle or latter part of March (according to local weather conditions) shake out and remove all straw from the manure. If leaves were used remove about one half of them.

Second: In a week or ten days, if weather continues mild, reduce the mounds one half their height.

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Third: After another week remove the rest of the soil from around the plants and mix with the manure. This gives a good rich top soil of four inches or so and eliminates the need of an early mulch.

The ramblers should be tied to their supports before the buds start. A delay at this time means loss of flowers as the eyes which have started to grow are easily broken.

Do not be in too great a hurry to uncover, especially if the weather should happen to be unseasonably warm. The plants start quickly once the protection is removed and a sudden cold snap would mean ruin to the buds. Better be a little late in uncovering, for then the plants will continue to make a rapid growth and will bloom more freely than those which are uncovered too early and have been checked by late frosts.

CHAPTER VI

PRUNING

Pruning is the scientific removal of those parts of a plant which the study of nature has shown to be worthless for producing the best results, thus throwing the entire vigor of the plant into the more desirable branches.

The reasons for the pruning of roses are several and perhaps the operation requires more care and skill than the pruning of any other plant. If a rose bush were not pruned it would be found that the older shoots would continue to get weaker as the plant aged, throwing flowers of poorer and poorer quality. The old wood would gradually die from lack of food as the nourishment is taken from it by the young growth which breaks out lower down. From this it will be seen that nature's method of getting rid of undesirable wood is one of starvation. Rose bushes, or rose trees as they are sometimes called, do not continue to grow onward and upward

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from one trunk. They behave rather more as a perennial making some new growth from the bottom each year, the old top gradually dying unless otherwise removed.

From the above it will be seen that the objects in pruning are:

1. To keep the plants young.
2. To keep the buds nearer the source of food.
3. To improve the shape of the plant and allow free circulation of air among the branches, which means keeping the plant healthy.

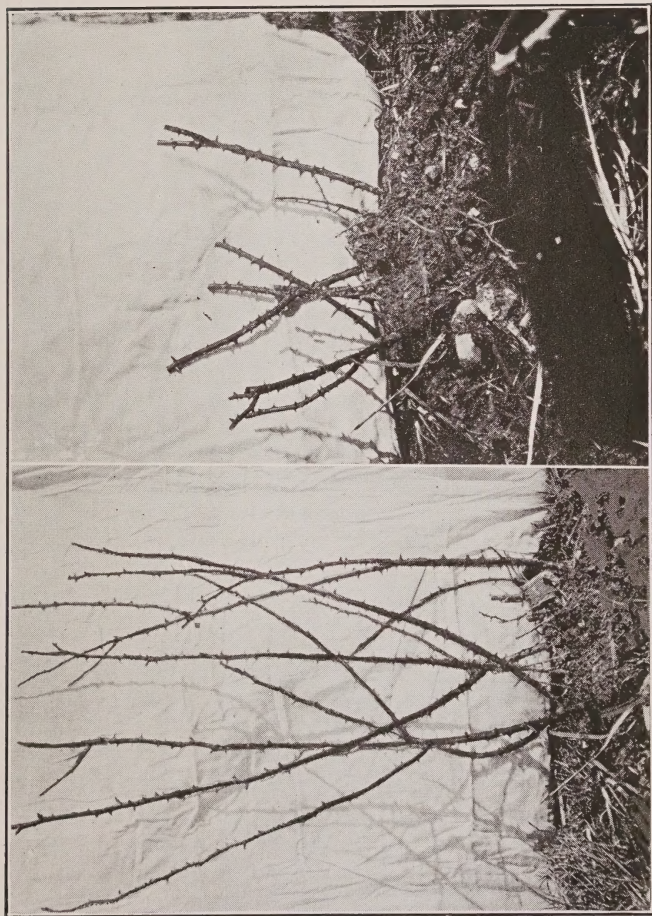
Since the rosarian's aim is to have healthy, well shaped plants, he studies each plant individually before doing any cutting.

There are two distinct phases of pruning:

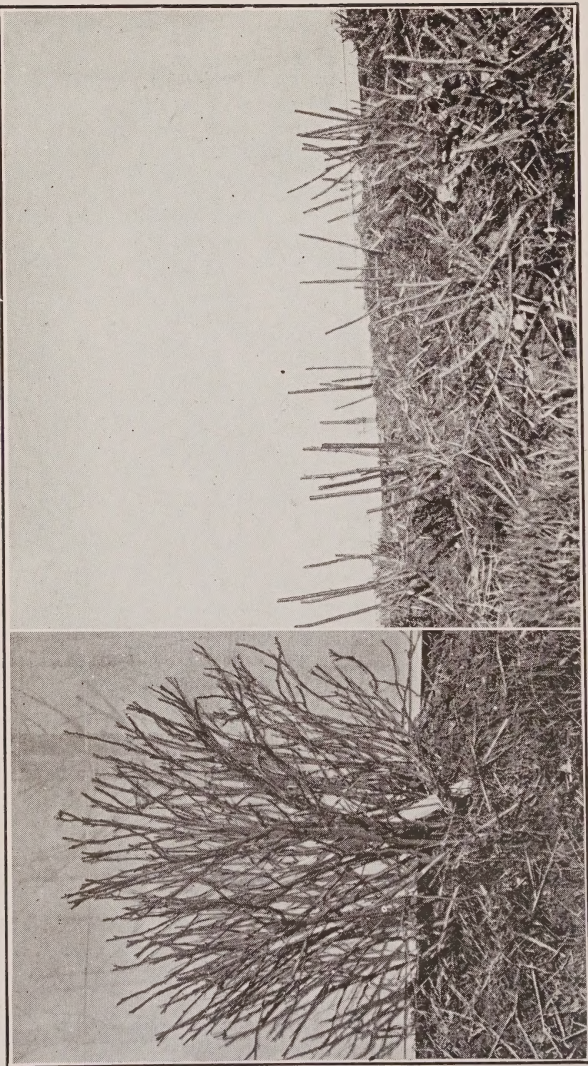
First: Thinning out. This consists of the complete removal of all dead, weak, unripe, misplaced or otherwise useless wood.

Second: The *cutting back* of the remaining shoots so that they may be given the best chance to attain the desired results.

When a shoot is thinned out it should be cut off at its starting point, wherever that



Left. Unpruned Hybrid Tea.
Right. Pruned to give quantity rather than quality of bloom.



Right. Hard cutting of the Rugosa produces innumerable new shoots that flower with great vigor. They may be symmetrically trimmed.

Left. A bed of hybrid perpetuals. These canes are not all cut to the same height but are pruned according to their requirements. The heavier shoots cut less severely than the weaker ones.

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may be. After a plant has been properly thinned, the remaining canes should be as nearly as possible equi-distant from one another and should present a well-balanced appearance from all sides. In pruning these remaining canes there is but one rule to follow: that is, the weaker the shoot the harder it must be cut; the stronger the cane the less severe must be the pruning.

Remember this:—the quality of the bloom is always in proportion to the strength of the stem which carries it; the strength of that shoot is in proportion to its proximity to the base of the plant.

The purposes for which roses are grown will govern to a certain extent the severity of the pruning. The generally accepted way of pruning roses for cut flowers is to prune for the finest blooms. This means that the heavy canes are cut back to four or five buds or eyes, which leaves from six to ten inches of the shoot. The weaker canes are cut to leave two or three eyes according to their vigor. Severe pruning is absolutely necessary if quality is desired.

For garden decoration where more flowers of poorer quality are required, the canes

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are not cut back to such an extent. The heavy shoots are usually cut to from eight to twelve eyes and the lighter growth is allowed to carry five or six. This system of high pruning is the one usually carried out with the Hybrid Perpetuals, for their blooming period is short, and a mass of color, rather than perfection of bloom is the aim. It must be remembered, however, that with such treatment the stems will become shorter and weaker. In order to overcome this tendency severe cutting every third year may be practiced.

A plant can be made to grow in any given direction by simply cutting down to an eye which points in that direction. Some varieties have the habit of throwing out one or sometimes two very large shoots on one side of the plant, the growth on the opposite side being very weak and poor. To correct this fault, particularly for succeeding years, the one or two heavy canes should be cut back very low to eyes which lead in the opposite direction. Remove all but the best of the weak wood and after growth has begun, do not allow the branches from the strong canes to get beyond control.

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Under ordinary conditions always cut to an eye which points outward. If this is not done one of the purposes is defeated by allowing the center of the plant to become filled with small weak growth that is frequently blind. Make the cuts between one quarter inch and one half inch above the eyes. To cut closer is apt to mean injury to the bud, while cutting farther away leaves unsightly stubs. Be sure that the cutting is done as smoothly as possible and at an angle of about forty-five degrees so that the water will not collect and start decay. Ragged cuts denote slovenly gardening and frequently result in stem rot.

Keep the pruning tools sharp, whether they be knives or shears. After becoming accustomed to its use, a knife will be found preferable to shears. An oilstone is an essential part of a pruning equipment, as is also a pair of good, stout, pliable leather gloves. It is impossible to do good work if the hands are lacerated at every move.

There are several errors which are commonly made by the amateur. The most frequent is that of leaving too many shoots when thinning. Take out all the weak

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growth. Two or three strong canes are better than any number of small ones. Never allow a plant to carry more than six or seven branches from the crown. Try to keep the center of the plant open.

Another practice of which most of us are more or less guilty is that of treating all types of roses the same. The habits of growth of the various rose groups should be carefully studied before attempting to prune. Pruning, when properly done, is simply an assistance to the plant in producing its best. *Don't prune for exercise.* In many instances we find all the canes of a plant or all the plants in a bed cut to a uniform height. This is a good practice when trimming a hedge but it violates the fundamental principles of rose pruning.

The most serious fault is perhaps that of not cutting back severely enough the canes that are allowed to remain after thinning out. Only in rare instances has severe pruning ever killed a rose plant. It frequently occurs however that a bush becomes useless through want of severe cutting.

In sections of the country where the winters are so extreme that the wood is killed

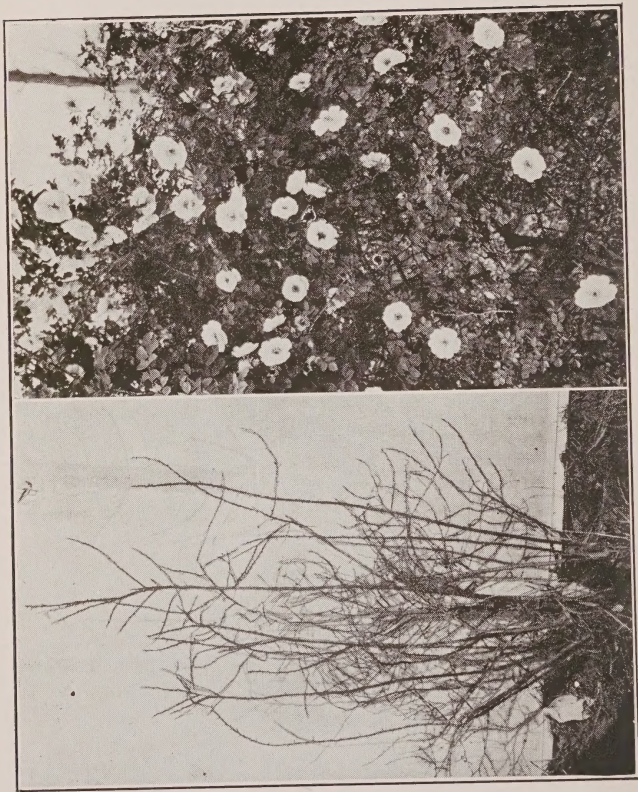


CLIMBING AMERICAN BEAUTY

A good showing of flowers always follows the removal of old wood.



PARADISE



Right. The Briars are not severely pruned. Some of the small weak growth is removed and the strong new shoots are shortened.

Left. The result of such treatment. Good sized flowers, plenty of buds, and blooms from bottom to top of plant without crowding.

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back to below the approximate heights given for cutting there is only one thing to be done. Remove all the dead wood, even though it means cutting down nearly to the soil. No roses are ever produced on wood which is blackened from frosts.

If the following suggestions are carried out, good results may be expected. The dates of course are approximate and must necessarily be changed to the season and locality.

In late March the Hybrid Perpetuals should be cut back to seven or nine eyes, with the exception of Frau Karl Druschki, Margaret Dickson and Gloire Lyonnaise. These three should have about two-thirds of the new branches cut away after being properly thinned. The Provence Rose, Moss, French, Damask and Hybrid Chinas should be given attention at this time. Their requirements are few,—simply thin out all weak wood. The Ayrshires and Semper-virens should be pruned lightly; some of the stronger laterals may be shortened. All the old wood of the Rugosas should be cut out and the young growth headed back to the desired height. Do not be afraid to

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prune the Rugosas. They thrive under harsh treatment.

Other species and their varieties except those noted below should also be pruned in March. Most of these should be carefully thinned and the young growth cut back one half its length.

Early April is the time to prune the Hybrid Teas.

Bourbons, Noisettes, and Musks require but slight cutting. A light thinning out, leaving the best of the old wood is the usual practice.

With the Austrian Briars the old wood is removed, the young growth headed back slightly and any straggling new shoots tied in.

Sweet Briars frequently send out heavy shoots from the base. These may be left at any height so long as they are not uniform. Some thinning is usually necessary. The Polyanthas, or Baby Ramblers, require careful thinning, but the new shoots should be cut sparingly.

Ramblers of the Wichuraiana group give exceptionally fine blooms when treated thus: As soon as the blooming period is

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finished, all the flowering wood is removed. In most sections the last of July is the time when this should be done. The old canes must be cut off close to the ground. Only the young shoots are left and not more than nine or twelve of these to a plant according to its strength. It will be necessary to go over the plants at intervals of two weeks to break off all new shoots which are bound to appear. Destroying this new growth as soon as it starts throws all the nourishment to the remaining canes which often attain a length of twenty-five feet by the first of November. These young canes are very pliable and must be kept tied in place. This pliability is a great asset when the ramblers are taken down for winter protection, there being seldom any cracking or breaking of the canes. It is customary to cut back the tips of the canes about one foot in the fall. This is to hasten maturity. If such cutting is not done in the fall it must be done in the spring to induce the growth of the laterals which bear the flowers.

Multiflora Rambler varieties are pruned as soon as possible after the flowering season. Cut down to the base all wood more

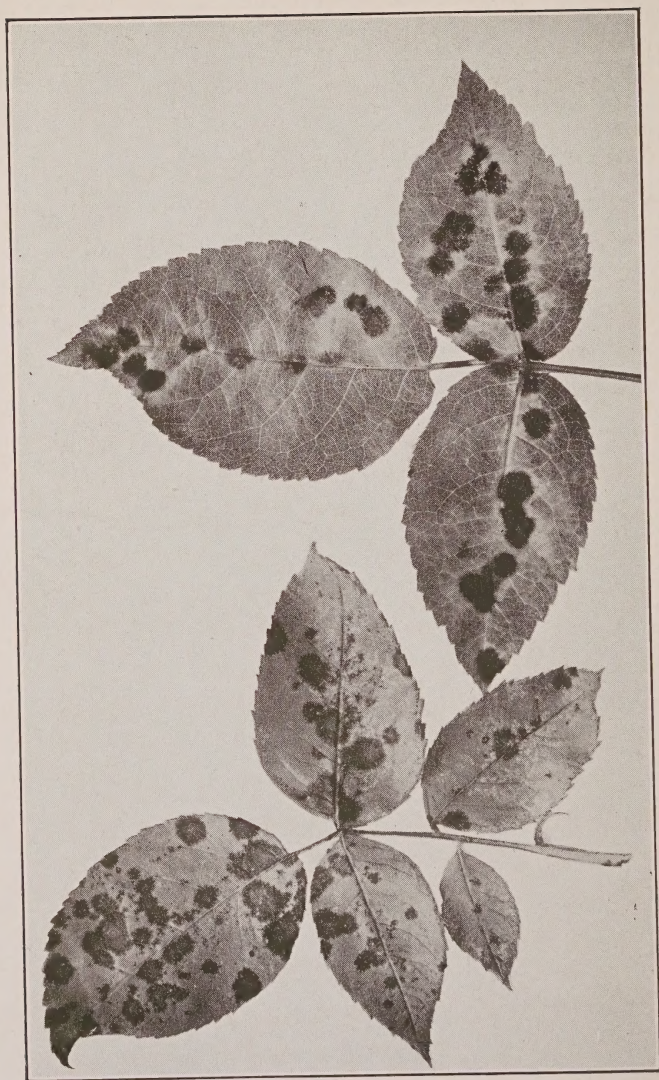
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than two years old. In many cases, especially where a plant has not been so pruned, this will mean the removal of considerable young growth, because Multifloras have a habit of throwing new wood from the old canes rather than from the crown.

Such treatment may seem very harsh but succeeding years will prove the wisdom of severe cutting. New canes are quickly developed and may be easily trained to take the place of the old wood. Of course it will be necessary to remove all but six or eight of the new shoots so that the selected canes will make as much growth as possible. This new wood is headed back to the desired height the following spring.



Left. Powdery Mildew.
Right. The curling of the foliage is one of the effects of mildew.



BLACK SPOT.

CHAPTER VII

DISEASES AND INSECTS

One of the most common diseases of the rose, wherever grown, is *powdery mildew*. Many varieties are seriously injured by it; others seem more or less immune.

The first signs of the disease are grayish white spots on the young leaves and shoots. Later the spots have a white powdery appearance, while still later this powdery covering disappears leaving dark colored areas. The buds, young shoots and leaves are curled and stunted. This killing of parts of the leaf area results in the loss of a great amount of foliage which in turn curtails the production of flowers.

Powdery mildew is caused by the fungus, *Sphaerotheca Parnnosa*, the spores of which are very light and are blown about by the slightest movement of the air, thus infecting other plants.

Control: The most effective remedy for powdery mildew is to dust the infected plants with a mixture of very finely ground sulphur 90 parts, and arsenate of lead 10

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parts. The dust should be applied when the disease first makes its appearance, and should be followed by fresh applications every ten days until no further signs are discernable.

It has recently been proved that rose plants growing in soil well supplied with potash were almost immune from mildew. Susceptible varieties, which were infected, were transferred to soil that contained large amounts of potash, and in a short time the plants became entirely free from mildew without the use of external remedies. It has long been known that potash has wonderful powers in promoting resistance to fungus diseases, but only very recently has any attempt been made to use it as a mildew control on roses.

Black spot is undoubtedly the most destructive disease of the rose. Nearly all of the cultivated varieties are affected, but not all are equally susceptible. The diseased plants lose their foliage prematurely, and leaf buds, which should remain dormant until next season, open late in the year. This loss of foliage and opening of buds give two results: first, poor, if any flowers the fol-

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lowing year, and second, unripened wood which is usually killed by the frosts. The disease first appears on the foliage as a dark brown or blackish spot with an irregular margin. This spot increases in size, the leaf area surrounding it becomes yellow, and soon defoliation occurs.

Black spot is caused by the fungus, *Actinonema rosae*. This parasite, unlike the powdery mildew fungus, does not appear on the surface but works underneath the cuticle of the leaf. The black color of the spot is due to dead cells in the leaf.

Control: Since the fungus lives over winter on the old leaves, where spores are produced which are a source of infection the following spring, it is obvious that the old leaves should be carefully collected and burned, preferably in the late fall. The best fungicide so far discovered is the sulphur-arsenate dust recommended for mildew. The efficiency of any fungicide depends upon the *time* of its application. While the mildew can be cured after it affects a plant, the black spot cannot. The black spot must be prevented from entering the leaf tissues, for after entrance has been

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gained, all applications of dusts or sprays are useless. The application of the fungicide should be begun *before* the disease appears and continued throughout the season at intervals of a week or ten days. Fungicides should be applied *before* rains, not after rains. Failure to apply them so that the plants go through a rainy period unprotected may offset the results obtained by an entire season's careful spraying. More of the failures in controlling black spot can be traced to the time factor than to any other cause.

There are many other fungicides but as the sulphur-arsenate dust is the cleanest, most efficient, most easily handled, and has enough lead arsenate in it to kill many of the chewing insects, it is the one to be recommended above all others.

ROSE INSECTS

There are several ways of classifying insects, but for the purposes of control, the classification that refers to the manner of feeding is most convenient. They are grouped as (1) biting or chewing and as (2) sucking insects.

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A study of the mouth parts shows that the chewing insects have an upper and lower lip and are capable of tearing vegetable tissue into pieces and swallowing it. In the other insects the mouth parts have been so modified that they seem to have no jaws at all. They have a long beak-like organ with certain parts of which they puncture the outer tissue of leaves and suck the juices of the plant. From the above, it is obvious that both classes of insects cannot be controlled in the same manner.

Generally speaking, the sucking insects are controlled by contact poisons. These may consist of chemical substances which destroy the skin and tissue beneath, or so cover the breathing pores of the body that suffocation takes place.

The chewing insects are usually controlled by using a poison substance on the leaf tissues. This is taken into the digestive system through the mouth.

There are, of course, exceptions in both classes where other means of control are necessary.

Rose Aphid (*Macrosiphum rosae*). These are pinkish green plant lice about one

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twelfth of an inch in length, that congregate in masses on tender tips and buds, sucking the cell sap and thereby stunting the growth and injuring the bloom. In the north the insect hibernates in the egg stage, but it continues to breed during the winter in the south. The first generation of aphids are wingless as are also many of the following broods, but winged forms are frequently produced and thus the species is disseminated. These insects multiply very rapidly, each female producing from thirty-five to forty young during her life. A generation is completed in about a month's time.

Control: Spray with nicotine sulphate (containing 40 percent nicotine) one part in 800 parts of water—one teaspoonful in two gallons of water. The efficiency of any of the contact sprays is increased by the addition of a small amount of soap. Careful spraying with whale oil soap or any good soap will give an effective control. Two treatments, forty-eight hours apart and repeated every three or four weeks, are more satisfactory than more frequent sprays at shorter intervals.

American Rose Slug (Endelomyia rosae).

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The slugs are greenish yellow larvae that skeletonize the upper surface of the leaves. A shiny black four-winged fly lays the eggs in the leaf tissue.

Bristly Rose Slug (*Cladius petinicornis*): The larvae are yellowish green, more or less bristly about $3/5$ inch long. They skeletonize the leaves when young, but later eat out holes frequently leaving only the large veins. In the north, there are three generations annually. The eggs of this species are inserted into the petiole of the leaves by the parent fly which closely resembles the preceding.

Coiled Rose Slug (*Emphytus cinctus*): Larvae are about $3/4$ inch in length, having metallic green bodies spotted white, with orange heads. Usually they feed on edge of foliage with bodies coiled beneath the leaf.

Control: A spray of arsenate of lead,—two pounds in fifty gallons of water or one ounce to one and one half gallons—is effective. Too frequent applications may cause a whitish deposit on the foliage. Hellebore, one ounce in two or three gallons of water, may be used.

Slugs can usually be controlled with the

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nicotine solution recommended for aphids.

Rose Leaf Hopper (*Typhlocyba rosae*): This is a small creamy-white hopper which feeds on the under surface of the leaves.

Control: Carefully spray the under side of the foliage with nicotine solution to which soap has been added. Three applications at three day intervals should suffice.

Rose Leaf Roller (*Archips rosaceana*): The mature caterpillars are about $\frac{3}{4}$ inch in length, olive green in color with black heads. They roll and web together the leaves on which they feed. They usually mature in a month and transform to dark brown pupae within the rolled leaves. The light brownish moths appear within two or three weeks and deposit their eggs on the leaves. There are two broods annually.

Control: Spray with arsenate of lead,—two pounds in fifty gallons of water. This should be applied early in the season.

Rose Chafer (*Macrodactylus subspinosus*): These long-legged, clumsy, grayish-brown beetles are one of the worst rose pests. They devour foliage, buds and flowers. The grubs from which these beetles develop feed on the roots of grasses in sandy soil only.

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A rose garden on heavy soil is very seldom troubled by these pests.

Control: This is a difficult insect to combat, because it will not feed on foliage covered with an arsenical. A partial control may be secured by using arsenate of lead sweetened with molasses.

Melrosine has been used with good results in some sections,—in others it is useless.

The surest method is to jar the beetles off the plant into pails or pans of kerosene. This is a daily occupation, but it is effective. In the case of a few plants it is safer to protect them with mosquito netting during the time when the beetles are most abundant.

Rose Scale (Aulacaspis rosae): This is a snow white circular scale about one tenth of an inch in diameter, usually found on lower branches, especially on roses grown in the shade. It is not very troublesome.

Control: Spray with lime-sulphur solution,—one gallon in eight gallons of water, before plants start into growth. Badly infested stems may be cut and burned.

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Rose Curculio (Rhynchites bicolor): This is a bright red snout-beetle, with black legs and snout. In some sections this insect is much more troublesome than the Rose Chafer. It usually appears on the rose bushes early in June, eating holes in the unopened buds and puncturing the flower stems. Many of the injured buds fail to open, while the others have the petals riddled with holes. The grubs feed within the buds and young fruit, and in late summer descend to the earth where they winter as pupae.

Control: Since the beetles breed in the fruit of the wild rose, these plants should not be situated near the rose garden. In small gardens, continued hand picking of the insects will be found most effective. Spraying with arsenate of lead,—two pounds in fifty gallons of water, will destroy many of the beetles in larger plantings.

Thrips. Thrips are yellowish gray semi-transparent insects about one thirtieth of an inch in length which infest the flower buds. By sucking the juices from the petals they cause brown margins to appear, and in

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serious infestations, the flowers are badly deformed. These pests are more noticeable during hot dry spells.

Control: Spray with nicotine solutions as recommended for aphids, or use a sweetened poison made as follows: water, twelve quarts, paris green, one tablespoonful, sugar, three pounds. Frequent spraying with clear water under high pressure will destroy many of them.

Red Spider (Tetranychus bimaculatus): This small insect is one of the most persistent pests especially in dry seasons. The red spider spins a fine web around the foliage and under this protection feeds on the outer tissues. The presence of this insect is usually indicated by the yellowing of the foliage.

Control: The best control is obtained by using a stream of clear water under 60-75 pounds pressure and washing the plants from base to tip. If such pressure is not available, a spray made by dissolving one small bar of Ivory soap in five or six gallons of water and applied to the underside of the foliage with a small hand pump will be found very effective.

CHAPTER VIII

PROPAGATION

Roses are propagated by cuttings, grafting or budding, by layers, by divisions, and by seeds.

Most of the common garden types are easily reproduced by cuttings either of hard or soft wood. For soft-wood cuttings a larger percentage will root if the wood is taken from a flowering shoot. The wood is in the best condition from the time the flower bud shows color until the petals drop. After the flower has fallen, the wood in some varieties is apt to be too hard to give good results.

The cuttings should be from two and one half to four inches long. The length depends upon the varieties as some have greater space between the nodes or eyes than others. Cuttings are usually trimmed to leave one eye at the bottom and two above. All but a single pair of leaflets are cut off from the two upper leaves, the lower leaf being entirely removed. With new or

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scarce varieties what is known as one-eyed cuttings are sometimes used. This simply means one eye at the base and another at the top. The former method usually gives stronger plants.

Clean, sharp, medium coarse sand is by far the best material in which to root rose cuttings. If only a few cuttings are to be rooted a box at least four inches deep may be used. When a larger quantity of cuttings is desired, a frame is the most satisfactory. Two or three inches of some coarse material such as broken pots, cinders, crushed rock, etc., are first placed in the bottom for drainage. The sand is put on next and given a thorough watering. Two inches of sand are sufficient. This must be very firmly tamped. A brick and plenty of elbow grease are all that are required to compact the sand. If the sand be rather coarse, a tamping followed by another watering and then more tamping will give the proper degree of firmness. There is no use trying to root cuttings in loose sand because the aeration is too great. A cutting which has once dried out is useless.

With the sand firmly tamped, and the

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cuttings trimmed, the next step is to insert them. An old knife or thin piece of hard wood and a lath (to be used as a straight-edge) are all the tools required for this operation. A narrow slit is made in the sand with the knife, using the lath as a guide. Ordinarily this incision is between one and one and one half inches deep. The cuttings are inserted up to the lower leaf and about one and one half inches apart. This distance will be governed by the size of the foliage. It is best not to have too much over-lapping of the leaves in the cutting bed. When a row of cuttings has been put in, the sand is pressed firmly against each one with the finger tips of both hands. The straight edge is placed against the first row of cuttings, given one or two smart raps with the handle of the knife,—this to firm the sand which is loosened when making the previous opening,—another opening made and the cuttings inserted as before. It is customary to space the cuttings one to one and one half inches in the row with the rows two to two and one half inches apart. After the cuttings are put in, they are given a good heavy watering. A heavy

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watering helps to firm the sand around the cuttings.

The propagating bed should now be shaded and remain shaded until the roots start to develop. Unbleached muslin makes an ideal material for shading a cutting bed. Sometimes hotbed sash that have had a coat of whitewash are used. The objection to sash is that they often fit so closely that practically all the air is excluded with the result that the cuttings smother. A propagating bed, while it requires shade, also requires ventilation. Have the shading material ten or twelve inches above the tops of the cuttings, and allow for air circulation at the sides and ends of the bed. While strong draughts are fatal to cuttings so is stagnant air.

Never allow the sand to become dry. In fact, it should be kept quite moist until after the cuttings have calloused. It is impossible to state how frequently the cuttings should be watered as conditions are variable. It will be necessary however to give the cuttings a light sprinkling of clean water three or four times a day the first ten days. The sprinkling is done to prevent too rapid

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transpiration. Of course on cloudy or rainy days this work may be omitted. One sprinkling a day after the first ten days or two weeks will suffice. About the end of the third week the roots should start to appear. From this period on the sand must be allowed to become somewhat drier. A dry sand causes a more rapid root development than does wet. After a cutting has roots one quarter to one half inch long it must be removed to soil. Remember that a good rooting medium contains no plant food,—that a cutting with roots is a plant and must have food.

A bed of rather light, well drained soil not too rich is an ideal location in which to plant the rooted cuttings. The first two or three weeks a light shade will be necessary. Young plants must be carefully protected the first winter.

All of the ramblers, the Hybrid Perpetuals, and about all the strong-growing hardy species can be propagated by hard wood cuttings. Wood of the season's growth is gathered just before severe freezing occurs. The cuttings are made about six inches long and are tied in bundles of convenient size.

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Placing the cuttings upright and burying with sand in a situation where frost cannot effect them is all the attention they require until spring. As soon as the soil can be prepared in the spring the cuttings are planted in V-shaped trenches. When planted *one eye only* should be above ground. Rich soil produces strong plants in one season.

Budding and grafting are old and well established methods of propagation. Budding consists of inserting a single bud with little or no wood, under the bark of the stock. This is best done when the bark slips or peels easily. July and August are the months when most of the budding is done in the nurseries. The style of budding in general use is known as shield budding. It derives its name from the shield-like portion of bark which is removed with the bud.

The stocks should be at least three-eighths of an inch in diameter to be budded easily. Smaller stocks can be budded but the operation requires more skill. Just before the buds are inserted, the leaves are removed from the base of the stock so that they will not interfere with the operation. A space of five or six inches above the ground is

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all that is necessary. They should not be removed more than two or three days previous to the budding as the growth will be checked and the bark will "set." The bud is inserted as close to the ground as the operator can work. The advantage of setting the bud so low is that the union can be set below the surface of the soil when transplanted. This prevents suckering. It is a good practice to set the bud upon the north side of the stock to protect it from the sun. It is claimed that a greater number of the buds will grow when placed on the north side. The buds are taken from strong well-matured shoots of the season's growth of the desired variety. Usually the upper buds are not fully grown and are discarded. The leaves are removed but a small part of the petiole or leaf stem is allowed to remain. This serves as a handle to the bud and greatly facilitates the operation.

A thin-bladed sharp knife is used to cut the buds. The bud is usually cut about one inch long. Some budders remove the eyes by cutting from below, while others prefer to make a downward cut. It does not matter how the cut is made if the surfaces are

smooth and the bud is not too thick. A bit of wood usually adheres to the bark when the bud is cut. Some nurserymen insist that it be removed and others allow it to remain. The majority of budders claim a quicker union when the wood is removed.

The opening which is to receive the bud is made by two incisions, one vertical and the other horizontal. These cuts are not deep, extending only through the bark. Usually the vertical opening is made first and is an inch or inch and a half long. The horizontal cut is made across the top of the vertical cut by a single rocking motion of the blade. Unless the bark slips very readily it will have to be loosened by the end of the blade. The bud is now inserted into the opening. The entire bud should pass into the cleft but if a portion of it projects above it must be cut off. The bud is now tied. Two or three turns of raffia above and below the bud will secure it. Care must be used not to bind the tying material over the eye. Two or three weeks later the plants should be gone over and the wrappings removed or at least severed so they will not constrict the stem and kill the bud. It is

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a good plan when removing the raffia to rebud any stocks which have died. The bud should remain dormant until the next season. Newly budded stocks should be well protected during the winter. The spring following the budding, the stock is cut off just above the eye in order to throw the entire vigor of the plant into the bud.

Grafting roses in the open in this country is not often practical. Plants sold for budding use are usually grafted and grown under glass. Grafting differs from budding in that cion or twig containing two or more eyes is generally used in place of the single bud. R. Manetti is generally used for stock. Dormant stocks one-quarter to one-half inch in diameter are potted in small pots and held at a temperature of about 50° F. When the roots have nicely developed, they are grafted.

What is known as the splice graft is commonly used. The stock is cut off as close to the pot as possible. A long smooth slanting cut is made. The bark and pith must not be roughened in the least degree. The cion should be about the diameter of the stock,—never larger. A cut is made on the

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cion to correspond with that on the stock. Cutting the cions so that they will fit exactly upon the stock is an art that requires a great deal of practice. The cambium layers of stock and cion must come together on one side at least. If they are of the same size and the cambium layers meet on all sides so much the better. When they are of unequal size a perfect fit on one side is all that can be accomplished. These are held together by wrapping and tying with raffia. The newly grafted plants are placed in an air-tight frame and kept at a temperature of 80° - 85° F. The atmosphere in the grafting case must be very moist to prevent the cions from dying. At the end of five days a union will have been effected when the case is opened for a few minutes each day and the temperature gradually reduced. Case grafting, as this method is called, is really for the professional and not the amateur.

Layering, while wasteful and somewhat cumbersome, is frequently employed when a few plants are desired. The operation is best performed in the early spring. Low branches of last year's wood are used. A

ROSES AND THEIR CULTURE

tongue is cut on the lower side of the branch below the bud or shoot which is to form the new plant. The branch is covered with earth at the point of the incision. It is usually better to hold the cane in position with pegs or wires. The soil covering the branch should at all times be fairly moist. In the fall the new plant may be moved to its permanent position.

Division is an easy manner of increasing any of the species which sucker. The old plants are lifted and torn apart. Plants so obtained are usually grown in the nursery for a year before being planted in the garden. This is not absolutely necessary but does give a better root system.

Seeds of many true species are often used to procure plants. Except to produce stocks on which to bud, this method of propagation is of little importance to the amateur. The seeds are gathered in the autumn and at once stratified in moist sand or allowed to ferment in a little water. While fermenting they should be kept in a warm place. When well rotted, they are easily rubbed out and washed clean. After cleaning, the seeds should be sown at once in

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rather light, well drained soil. When the ground is frozen, the seed beds are given a covering of well rotted manure, leaves, straw, or other similar material. As rose seeds seem to require an "after-ripening" period many of them will not germinate until the second spring. Stratifying and fermentation both tend to aid uniform germination. Some claim that if the seeds are gathered and sown before they are thoroughly ripened germination is hastened. This statement is contradicted by other scientists who hold that seeds germinating soon after ripening; i. e., having the shortest after-ripening process, produce seedlings which are less vigorous and more subject to disease than those which germinate later. For all but the professional, however, gathering and sowing the seeds as soon as they are ripe will give satisfactory results.

Rosa rubiginosa usually requires two years to germinate although some of the hybrids germinate the spring after they are sown.

In the spring the covering may remain on the beds until the seedlings show through the soil. Seedlings make a rapid growth

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and may be transplanted when one year old. In some cases the stock may be large enough to bud the first summer but usually not until the second season.

These propagating methods are summarized in hopes that they may be of use to the enthusiast and to those who wish to perpetuate rare or scarce varieties. Naturally the amateur cannot hope to produce plants as cheaply as the nurseryman—frequently the plants raised in the garden are not as good as those purchased due to the fact that the larger grower gives the young plants constant attention while the amateur cannot always do so.

However, there is more satisfaction to be derived from plants thus propagated than from bushes which someone else has produced.

Reproduction by cuttings and layers are the two methods which will be the most satisfactory with the home gardener. Grafting and budding, although not difficult, require a certain amount of practice before they become worth while to the amateur.

CHAPTER IX

EXHIBITION BLOOMS

Perhaps the most interesting phase of amateur rose growing is the production of show or exhibition flowers. The growing of flowers worthy of merit in an exhibition calls for much care and attention to details. There is no group of plants which responds more wholeheartedly to personal attention than the rose. It is only by individual care that the finest flowers are obtained.

Every rose lover ought to try for meritorious blooms. To produce prize winning flowers one must start at the beginning with that ideal in mind. Generally the best results are obtained when special care is taken in making the beds in which the exhibition varieties are to be grown. These special beds will of course vary greatly in construction to meet the soil and climatic requirements. Heavy soils in sections where there is great precipitation demand perfect drain-

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age. Loose sandy or gravelly soils call for beds which will hold the moisture.

The next point to consider is the varieties which are to be grown. Not all types of roses will produce flowers that will meet with the judges' approval. Flat topped or globose buds generally do not make as good an appearance as the long pointed varieties. In other words a very double flower is not as good as one with fewer petals. On the other hand the bloom must contain enough petals so that when necessary it may be cut a few days before being staged and still remain in good condition. Varieties having few petals open quickly and frequently are in poor condition to be shown. Short stemmed or weak necked varieties never give the desired flowers. The stems must be long, stiff and straight. There must be no lack of foliage. Varieties which are inclined to make but one terminal bud with few laterals are usually the best. Of course disbudding must be practised on many of the good varieties. This must be done as soon as they are large enough to be seen so that all the nourishment will go to the one flower.

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It is useless to try to grow fine flowers from poor weak plants. Start right by planting strong healthy plants budded on Multiflora stock. Plant them carefully and do everything possible to promote healthy growth. Some nurserymen carry an extra strong grade of plants which can be purchased at an additional cost.

Pruning is an essential factor in raising the blue ribbon flowers. Leaving but two or three eyes to a shoot and not more than four canes to a plant is the accepted method. Any weak or blind growth which may appear must be removed. Poor growth seldom follows severe pruning.

When the plants are making active growth begin to feed them. Nitrate of soda will help to lengthen the stems but must be applied with care. After nitrate of soda has been used always follow with some readily available form of phosphoric acid. The exhibition plants must carry their flowers erect. Some growers obtain excellent results by using liquid manure once every four or five days. No definite rules can be given for feeding these plants other than those given under "Soils and Fertilizers,"

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(page 32). Plant growth may be hastened by using water at about blood heat. Some exhibitors always use warm water. The liquid fertilizers may be applied warm. Constant use of warm water brings the plants into flower earlier than when cold water is used. Excellent foliage and fine flower texture result from the use of warm liquids. When using great amounts of liquids the drainage must be perfect.

The condition of the foliage is often the deciding factor in a close competition. This means that the plants must be carefully watched and measures taken to prevent insect injury. Leaves that are disfigured by mildew or black spot of course should never be shown. Keep the plants well dusted with the sulphur arsenate mixture.

The finest blooms are usually produced with the aid of a flower protector. This will shield the bloom from the direct rays of the sun and will prevent bruising and spotting by wind and rain. On the European market there are several styles of protectors. They are made either of a specially prepared paper or thin opaque glass in the form of a cone, about eight inches in di-

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ameter and ten or twelve inches high. This height is necessary for air circulation. The shields are held in place by a cross-arm fastened to an upright to which the plant is also tied. As far as is known the American seed houses do not carry these protectors. However, very efficient shields may be easily made. Secure some heavy white waxed paper or similar material. Cut out a circle, the radius of which will be the desired height of the shield. Divide this circle into three equal segments. Form each piece into a cone and fasten the edges together with paper fasteners. Another fastener at the top of the cone by which it is tied to the support completes the protector. These are good for only one season. Do not use a material that will give too much shade because some light is essential for good color. The object is to protect the developing flower from the burning rays.

The yellow, orange, soft pink and some red varieties are most susceptible to sun injury. When the buds first show color is the time to place the protectors in position.

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Do not get them placed too close to the flower.

When an exhibition is planned it is impossible to fix a date that will find all varieties at their best. Some will be a few days early, others a little late. Do not be alarmed if the flowers are ready to be cut four or five days before they are to be staged. Above all things, do not allow the bloom to develop on the plant. Cut it as the petals start to unfold. Of course all cutting should be done early in the morning while the wood is firm and cool. When it is necessary to hold the flowers for only a few days, each bloom should be wrapped in wax paper and the stems plunged into cool water in a cool dark place.

It sometimes happens that the flowers must be kept a week before being staged. When such is the case the following suggestions should be carried out. Place the freshly cut blooms in cool water and store in a cool place for twenty-four hours. At the end of this period remove from the water and wrap each flower in wax paper. A heavy cardboard or wooden box should

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be lined with several thicknesses of wet newspaper. Use a roll of paper or excelsior across one end of the box to form a pillow so that the heads will not be broken. The flowers are placed carefully in a single layer and cracked ice is strewn around the stems for about one quarter of their length. If there are flowers enough for another layer the procedure is repeated. Never place one layer of flowers directly upon another. Always leave the flower heads projecting so that no bruising will occur. When all the flowers are placed in the box put on a two inch layer of ice and cover with moist paper. The layers of flowers should be separated by using heavy wax paper. If possible, the box should be placed in a refrigerator. A cool cellar will answer if an ice-box is not available. See to it that the end of the box which contains the stem is lower than the other. If this is not done the water formed by the melting ice will ruin the flowers. Examine the flowers every twenty-four or thirty-six hours. The ice will need to be replenished. Flowers may be kept in perfect condition for ten days or more by this method.

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The blooms should be removed from storage several hours before they are staged. Using a sharp knife, remove about one half inch from the end of the stem. The cut should be long and slanting so that as much of the bark be exposed as possible. Plunge the flowers into cool water in a place where draughts will not strike them. If some of outer petals have been injured during the storage, remove them. It is best to keep the flowers covered with light wax paper until they are placed on the exhibition tables. Dirty blooms never win prizes.

Study the schedule of classes carefully before making an entry. When a specified number of blooms is called for see that the number is exactly right. One flower more or less than the required number may disqualify a vase. Take time to make tasteful displays. Each flower in the vase should show to the best advantage. In a group of roses try to have the whole effect pleasing. As a rule there is not much danger of the colors clashing. Occasionally some shades of pink will be found that do not harmonize with other colors. Use care when arranging such varieties.

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Exhibits of cut flowers are usually judged by points in accordance with the following official scale of the American Rose Society:

Size	15
Color	20
Stem	20
Form	15
Substance	15
Foliage	15
	100

Stage the exhibits early so that the judges may have time to complete their work before the public is admitted. Accept the judges' decision without grumbling—they usually know their business. If flowers from a neighbor's garden win—congratulate the winner and cultivate his acquaintance. He may be able to offer valuable suggestions. Another year the prizes will go to different growers and you may be one of them. Do not be discouraged if the flowers fail to win an award. All varieties will not thrive under the same set of conditions. This is proven by the fact that no single grower wins prizes in all classes. Any rose plant

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of known merit should be given at least three years' trial before being discarded.

The quality of the flowers shown in many amateur exhibitions often rivals that product of the professional. It is through these exhibitions that interest in rose growing is developed and new methods are brought out.

The following brief schedule of classes will make a very interesting amateur exhibit and give every rosarian a chance to enter one or more classes.

Class I. 10 square feet cut blooms any type arranged for effect.

This may be carried out so that a separate class for ramblers, polyanthas, H. T. s. H. P. s. rugosas, etc., will be provided.

Class II. Vases of 6 blooms of a variety. (To compete against other vases of same variety.)

Class III. Best single bloom of given varieties. (Conditions same as class II.)

Class IV. Table decoration—roses only.

Class V. Best vase arrangement—roses only.

Class VI. Best basket arrangement—roses only. Any entry may compete in one class only.

It is generally advisable to make a separate section if professional gardeners are going to enter. The classes may be the same, but the amateur should not be obliged to compete against the professional or nurseryman.

CHAPTER X

SPECIES AND VARIETIES

The various types of garden roses may be roughly divided into three large groups, according to their habit of growth:

- I. Rambler and pillar types
 - Multiflora hybrids
 - Setigera hybrids
 - Wichuraiana hybrids.
- II. Large bush types
 - Sweet briars
 - Mosses
 - Rugosas
 - Various species.
- III. Dwarf bush types
 - Hybrid perpetuals
 - Hybrid Teas
 - Teas
 - Polyanthas or Baby Ramblers.

Ramblers of the Multiflora type are the earliest to flower. These should be planted in an airy location, never against a solid wall or building owing to their suscepti-

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bility to mildew. Its dull rather soft rough foliage seems to offer ideal conditions for the development of the mildew spores. Although Crimson Rambler is still rated among the best by some growers, the group as a whole is being replaced by the Wichuraiana hybrids.

The Setigera group, although small, offers some excellent varieties. In flowering season it comes between the Multiflora and Wichuraiana, but the species *R. setigera* is a late bloomer. These are interesting because of the fact that *R. setigera* is about the only hardy American climbing species. It would seem probable that further breeding work would give more and better varieties. The present varieties do well under a great diversity of soil and climatic conditions and for this reason deserve to be more widely used.

Wichuraiana hybrids are by far the best of the rambler group. The small shining dark green foliage forms a fine background for the flowers and as the type itself is more or less evergreen it makes an attractive object even late in the season. Many varieties of this type do their best when kept close to

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the ground. As covering for banks or terraces, *Wichuraiana* and its hybrids have no equal. The branches themselves, frequently taking root, help to hold the soil in place. *Hiawatha*, a small single red, *Newport Fairy*, single pink, *Milky Way* semi-double white, and *Dorothy Dennison* pale double pink are among the best for this purpose. Planted so that they will clamber over stumps, stone walls, and to form masses of color along the edges of rock gardens they are unsurpassed. The long pliable canes are easily trained over arches, pergolas and arbors. They are frequently used on fences to serve as screens. Perhaps the best results are obtained when plants are trained on cedar posts. The posts should be eleven or twelve feet long set about three feet into the earth. Cedar trees with the branches cut to leave stubs about twelve to fifteen inches are ideal. The branches, being at unequal intervals and on all sides, allow the posts to be completely covered with the rambler canes. When grown in this manner the light and air reach a plant on all sides. A little care in tying the canes will give a column of flowers two to two and a

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half feet in diameter and eight to ten feet high. The choice varieties should always be grown this way.

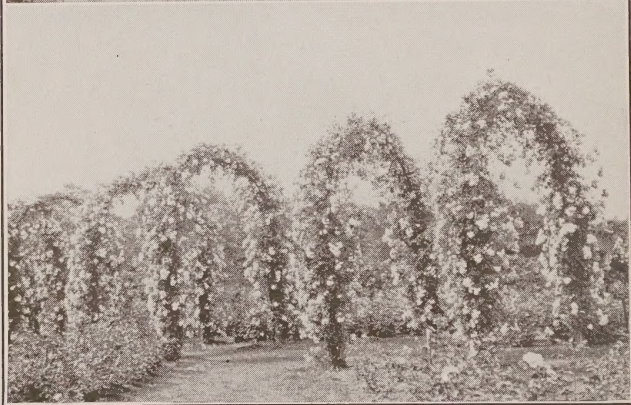
Dwarf climbers or pillar roses are treated in the same manner except that the posts seldom exceed eight feet.

The important factors to consider in ramblers aside from color is the date and length of flowering season. These two items are of great importance when it is intended to use ramblers of a certain color as a background for other flowers either roses, perennials or annuals as is frequently done. It often happens that a beautiful color effect is entirely lost by having a background of dirty faded flowers instead of a mass of fresh soft color. This might easily have been avoided if more consideration were given to the above mentioned points. For use as backgrounds, only the small flowered varieties should be selected.

In choosing material to be used as specimen pillars or over arches, trellises and pergolas, the large flowered sorts are preferable. These as a class are becoming more popular each year. Many of these varieties are excellent for cutting, and for garden



ROSA SETIGERA—THE PRAIRIE ROSE.



Upper. When grown in this manner ramblers afford protection from the winds for the more delicate bush roses.

Lower. Rambler arches—Elizabeth Park, Hartford, Conn.

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decoration they are unequalled. Climbing American Beauty is one of the older varieties of this type and in many sections considered one of the best. Its clear rose pink color holds well even under adverse conditions. It is an early bloomer and has a season of about three weeks. The petals are inclined to hang on even after they have wilted and of course detract from its beauty. Dr. Walter Van Fleet is another pink being very much lighter in color and flowering somewhat later than Climbing American Beauty. In fact the former has frequently finished blooming before Van Fleet has well begun. This variety is very strong growing, has excellent, mildew resisting foliage and a long flowering season. Silver Moon and Purity are undoubtedly the best whites of this class. In yellow there is the delicately fragrant Gardenia and the wonderfully colored Aviateur Bleriot. The latter is not strictly in the large flowered class but is really too large for the small flowered group. Christine Wright is one of the most attractive of the group, its color being a beautiful salmon pink. It flowers very early in the season lasting a full three weeks and

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then in late August it throws another light crop of excellent blooms. There is one more variety which must be mentioned and is considered very fine by all who have seen it. Paul's Scarlet Climber, although in many sections growing more as a pillar than a rambler, is the best large flowered red on the market today.

Continuity of bloom is hardly to be expected in the ramblers, but the time is not far distant when that quality will be obtained. Mr. Peter Lambert of Trier, Germany, has produced five varieties of the small flowered pillar type which bloom profusely and continuously during the entire season. The plants send up new canes from the crown and each shoot is a flower head. One of the varieties, a yellow, had three large panicles at one time, the largest measuring eighteen inches from base to apex and ten inches in diameter. It is to be hoped that the efforts of such breeders may continue until the type is well established.

The Sweetbriars, although requiring considerable space, are an interesting group. Some of the varieties have flowers which are

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more or less inconspicuous but the fragrance of their foliage redeems them. They are also valuable on account of their colored fruits which hold well into the fall. The following seven varieties are probably the best of this class:

Harrison's Yellow
Amy Robsart
Flora McIvor
Lord Penzance
Lady Penzance
Meg Merrilles
Brenda

At present time Moss roses are almost obsolete. Many years ago they were the favorite flower for the boutonniere but today only a few varieties are listed by the nurserymen. Their flowering season is rather short and in some cases the colors are not clear. Wichmoss, a hybrid resulting from a cross between *R. wichuraiana* and Common Moss is a very interesting climbing form of this group. Other varieties are Princess Adelaide, Old English Moss, Crested Moss, Crimson Globe, Henri Martin, and Common Moss.

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R. rugosa and its hybrids furnish the most satisfactory group for general use. They will thrive on almost any soil from seashore sand to clay. Its rough dark green foliage is more or less immune from disease and the plants are very hardy. Some of the hybrids such as Conrad F. Meyer, Nova Zembla and Sir Thomas Lipton have a very long flowering season. For hedges, barriers and in mixed shrub borders the Rugosas are unsurpassed. The fruits are large and brightly colored, a point which should be given more consideration than it now receives. A careful selection of varieties and species will furnish color in a rose garden until long after Christmas. Species which fruit freely afford a source of food for many birds. Pheasant and quail are frequently found around Rugosa planting in the winter when other food is scarce. Ruffed Grouse may often be seen close to the dwelling of man feeding on the rose seeds. There is a trailing form of Rugosa which is sometimes cataloged as *R. rugosa repens alba* and sometimes as *R. repens alba*. It is a cross between *R. wichuraiana* and *R. rugosa alba*. The flower is a large single white. Flower

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heads contain from seven to forty buds which open usually two or three at a time thus giving a blooming season of about four weeks. This beautiful variety is fully as hardy as either of its parents but is apparently little known. It seems to be at its best when allowed to remain close to the ground. Low stumps, rock piles and banks are ideal locations for it.

Max Graf is a pink of much the same habit.

A particularly desirable form of this group is F. J. Grootendorst. It is the result of crossing Baby rambler with Rugosa. The small, double red, fringed flowers are produced continuously throughout the season.

While many of the species are unsuitable for planting in the small gardens, there are many locations where they could be used as screens or hedges. In many instances they might well replace some of the deciduous shrubs now used in the border. Their flowering season is fully as long, and their habit of growth is as varied as much of the material now used for that work. There is great diversity in color and form of both branch and fruit.

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Including *R. setigera* described above there are five American species which should be better known. *R. nitida*, a low upright shrub with narrow bright green shining foliage and *R. virginiana*, a taller growing species with broader, dark green shiny leaves are best for moist locations. The flowers of both are more or less solitary. There is also a low growing form of *Virginiana* sometimes classed as *Virginiana Alba*, that has bright green stems and white flowers. Against the reddish brown branches of some of the others the clear green of this variety gives beautiful color contrast during the winter. On rocky slopes or dry soil *R. humilis* should be used.

Many of the European and Asiatic species are very hardy and lovely in foliage, flower and fruit. The chief difficulty lies in securing the plants. Most nurserymen carry but few of the species.

R. spinosissima or Scotch Rose is one of the best. This is very variable in color and habit. While three to four feet is its average height some forms rarely reach eighteen inches and others exceed seven feet. It ranges in color from the pure white (*R.*

ROSES AND THEIR CULTURE

altaica) through to pale yellow and from flesh to deep pink. Some of the hybrids carry a disagreeable shade of magenta. The group spreads rapidly by suckers and is very hardy, doing well in any location. The leaves are small, composed of 5-11 leaflets. Short stemmed flowers are carried along the branches in the leaf axils. The globose purplish black fruits hold until the following spring.

R. hugonis—Golden Rose of China. This rose makes a shrub four to five feet wide and six feet or more high when mature. Its branches are reddish maroon and the flowers clear golden yellow. In most places it is very hardy but it was impossible to establish it at the American Rose Society test garden at Ithaca, New York.

R. xanthina—A strong growing, broad thorned, graceful species similar to *Hugonis* in color of branches but bearing flowers of a paler yellow. While not as lovely as *Hugonis*, it will thrive where the other will not. The fruits of both are deep scarlet.

The characteristics of the Hybrid Perpetual group may be described as stiff up-

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right growth, flowers of all types, large, inclined to be flat, generally of dark colors, foliage dull green wrinkled, not shiny. The Hybrid Perpetuals, owing to their short flowering season, are rapidly being crowded out of the garden by the Hybrid Teas. For garden decoration or mass effects there is nothing that can take their place. They are extremely hardy and therefore are suitable for the cold northern sections. Most of the varieties are very fragrant. A list of some of the best of this group is given below:

Anne de Diesbach—very large, carmine pink

Baron de Bonstetten—large, dark crimson

Baroness Rothschild—pale pink

Captain Hayward—large, full, scarlet crimson

Clio—flesh to rosy pink

Frau Karl Druschki—the finest white garden rose

J. B. Clark—very large, dark, scarlet crimson

George Arends—large, soft pink, one of the best H. Ps.

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General Jacqueminot (Jack rose)—clear red

Gloire de Chedane Guinoisseau—large, fine, vermillion

Heinrich Münch—very large, soft pink

Hugh Dickson—strong, fine form, scarlet

Magna Charta—rose pink

Mrs. John Laing—more or less continuous bloomer, clear pink

Ulrich Brunner—bright cherry red

Margaret Dickson—white, pale pink center

Prince Camille de Rohan—deep purple crimson

Ludwig Müller (Yellow Druschki)—tender—inclined to fade. This variety is comparatively new and is not as yet generally catalogued.

The Hybrid Teas are the most popular garden roses at present and they well deserve their position. Their range of color seems almost unlimited and most of them bloom continuously. When choosing varieties of Hybrid Teas the chief factor to consider is the blooming season. Some of them will flower week after week throughout the entire summer while others

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flower profusely in June and early July, throwing only a few blooms during the hot weather. From the latter part of August on until frost they seem to regain their vigor. This period of intermittent blooming is not confined to any one color. Some of the finest varieties, so far as perfection of flowers go, bloom in June and not again until the weather gets cooler. This is of importance to the stay-at-home gardener, though if a person is at home during the early part of June and then away at the shore or mountains until September, the blooming qualities of a variety need not be so seriously considered.

A really good garden rose should be capable of producing six or seven flowers a month for the entire season;—in other words a flower every five days. That would be the ideal rose, giving a fresh bloom by the time the old one faded.

The Tea roses as a class have not given as satisfactory results as garden subjects even in the milder sections, as the Hybrid Teas. Their color, form and fragrance are all that could be desired but they are very difficult to handle. Mrs. Herbert Stev-

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vens, a white variety, is a fine, strong growing, free blooming rose. It is as hardy as many of the Hybrid Perpetuals. Rosarians who know this variety rank it next to Frau Karl Druschki as a white garden rose. Lady Hillingdon, a yellow, W. R. Smith, a pale pink and Souvenir de Catherine Guillot—a pinkish orange are some of the best.

Seldom do the polyanthas receive the attention they deserve as a class. They are beautiful little plants and are often serviceable in carrying out a color scheme when no other plant will fit. For the most part they are fairly continuous bloomers, although under extremely severe conditions many of them will become intermittent. Several of the good varieties are spasmodic in their flowering but are well worth growing. Echo a large light-pink, Schneekopf a pure white, and Gloire des Marches the deepest crimson, are all intermittent but invaluable. Perhaps one of the finest and most continuous is the beautiful Baby Elegance. The wonderfully soft orange-yellow of the opened flower fading to a creamy white, then changing to a clear soft pink puts this smallest flowered variety in a class by it-

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self. The flowers are attractive at all stages. When the petals are about to fall there are always salmon colored buds ready to take the place of the older blooms.

Definite information regarding the blooming qualities, season, and length of flowering period of some of the best varieties grown today is presented in the accompanying tabulated lists. The figures given are the average of five years' records. In determining the number of flowers produced by the Hybrid Teas only a single flower to a stem was allowed and each stem was cut off to within two eyes of the branch from which it came. With most of the varieties six plants were under observation. No special attention was given. The beds were hoed once every ten days. In early May a light application of acid phosphate was given and two weeks later a little Nitrate of Soda was used in liquid form. The garden was not watered or irrigated in any manner. Soil conditions were far from ideal, being a very heavy clay and poorly drained. Undoubtedly higher figures would be obtained under more favorable conditions. The average temperature for the four

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flowering months is as follows: June, 66; July, 70; August, 67; Sept., 50. Average precipitation per month: June, 3.88'; July, 3.75'; August, 3.24'; September, 3'.

It must be remembered that while the data is accurately recorded for that particular section of the country it does not necessarily follow that the varieties would behave the same elsewhere. However, a general idea of what may be expected can be drawn.

HYBRID TEAS

Pink

	June	July	Aug.	Sept.
Amalie de Grieff, pale flesh pink.....	8	4	6	5
Autumn Tints, light pink, splashed copper..	4	4	5	4
Betty, coppery pink.....	4	6	3	3
Caroline Testout, clear pink.....	5	4	4	6
Countess of Gosford.....	6	4	5	6
Cleveland, glowing pink.....	8	3	3	1
Dean Hole	5	6	3	3
Duchess of Normandy.....	8	5	2	2
Dora Hansen	5	3	2	4
Duchess of Sutherland.....	8	3	3	2
Duchess of Westminster.....	4	4	1	3
Earl of Warwick.....	3	7	3	5
Edgar M. Burnett.....	5	2	2	3
Edith Part	7	7	3	3
Farbenkoenigen	6	5	4	4
Gainsboro	5	4	1	2
Gen. Sup. J. A. Janssen.....	8	3	2	5
Hilda Richardson	8	17	8	9
J. L. Mock.....	5	5	3	4
Koenigen Carola	5	3	1	1
Lady Alice Stanley	6	3	2	4
Lady Ashtown	8	5	4	3
Lady Battersea	3	5	5	5
Lady Ursula	9	5	7	8
La France	5	4	1	2
La Tosca	9	7	6	9
Mary Countess of Illchester.....	5	7	3	4

Bloom records used with permission of Doubleday, Page and Co.

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HYBRID TEAS (Con.)

Pink (Con.)

	June	July	Aug.	Sept.
Mrs. J. B. Walker.....	3	1	1	2
Mrs. Geo. Gordon.....	6	7	6	4
Mrs. J. Lynas.....	4	4	2	1
Mrs. W. Christie Miller.....	6	7	3	5
Mme. Leon Paine.....	8	6	5	7
Mme. Jules Grolez.....	7	4	4	7
M. Henri Fontaine.....	2	3	3	4
Radiance.....	10	5	3	2
Renee Wilmart Urban.....	2	4	4	2
Panama.....	6	7	5	6
Pharisaer.....	3	6	5	4
Souv. de Pres. Carnot.....	4	9	5	5
Viscountess Folkstone.....	5	5	5	6
Wellesley.....	4	3	2	2

Red

Admiral Ward.....	5	5	2	1
August Hartmann.....	5	3	1	3
Brilliant.....	8	5	2	2
Cardinal.....	8	6	2	8
Col. Le Clerc.....	5	5	1	2
Chateau de Clos Gougeot.....	5	8	3	5
Crimson Champion.....	3	4	4	2
Defiance.....	8	6	2	2
Fearlate.....	16	15	6	6
Etoile de France.....	7	6	2	3
Gen. McArthur.....	7	8	4	5
George Waud.....	3	7	2	3
Gruss-an-Teplitz.....	25	12	15	8
Hector Mackenzie.....	5	2	2	4
Helen Gould.....	5	3	1	3
H. F. Eilers.....	4	7	2	2
Hoosier Beauty.....	3	4	1	2
Killarney Brilliant.....	5	3	4	2
Laurent Carle.....	4	5	1	3
Lieut. Chaure.....	13	4	1	5
Louise Lilla.....	4	4	6	5
Manuel P. Azevedo.....	8	5	1	4
Mevrow Dora van Tets.....	8	8	6	4
Mrs. Muir Maclean.....	3	4	2	1
Mrs. Maud Dawson.....	3	5	2	1
Prima Donna.....	4	5	3	5
Red Cross.....	7	8	4	2
Red La France.....	3	5	1	2
Red Letter Day.....	8	15	7	10
Red Radiance.....	6	5	2	6
Rhea Reid.....	5	4	3	6
Richmond.....	5	4	1	2
Robin Hood.....	12	5	8	7
W. C. Gaunt.....	6	6	1	1
William Cooper.....	6	5	3	5

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HYBRID TEAS (Con.)

White and Flesh White

	June	July	Aug.	Sept.
Bessie Brown	5	6	3	4
British Queen	4	5	2	7
Clarice Goodacre	4	5	2	2
Kaiserin Augusta Victoria.....	5	7	3	4
Modesty	3	4	2	3
Molly Sharmon Crawford.....	7	6	4	7
Mrs. Andrew Carnegie.....	8	10	9	6
Mrs. Cornwallis West.....	16	3	2	0
Mrs. Herbert Stevens.....	10	6	11	7
Mme. Jules Bouche.....	2	7	3	6
Nathalie Bottner	4	6	4	5
White Killarney	4	7	4	6

Yellow

Duchess of Wellington.....	3	12	2	4
G. Amedee Hammond.....	21	8	4	2
Harry Kirk	6	8	7	5
Imogene	4	8	6	3
Margaret Dickson Hamill.....	6	5	3	2
Mrs. Wymess Quinn.....	4	2	2	2
Souv. de Gustave Prat.....	7	9	4	3
Sunburst	4	7	5	6
Tototo Gelos	3	4	3	2
Tipperary	8	6	4	1

Salmon and Apricot Shades

A. R. Goodwin.....	9	11	9	5
Chrissie Mackellar	5	8	3	6
Frau Lilla Rautenstrauch	3	2	1	2
Joseph Hill	2	9	8	2
Louise C. Breslau	3	4	1	1
Marquise de Sinety	5	6	5	2
Mrs. A. R. Waddell.....	7	7	3	8
Mme. Hector Leulliot.....	7	6	4	4
Mme. Edouard Herriot	5	7	3	5
Muriel Dickson	3	2	1	4
Ophelia	5	5	6	2
Prince de Bulgarie.....	4	6	4	2
Prince Charming	15	12	6	6
Queen Mary	9	9	9	3
Willowmere	7	5	5	3

Singles

Old Gold	7	10	10	7
Irish Beauty	5	7	2	5
Irish Brightness	71	2	0	0
Irish Harmony	4	5	3	4
Irish Modesty	17	4	2	4
Isobel	7	5	6	3
Ulster Gem	6	9	2	3

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RAMBLERS

(1)	American Pillar		Single, red-white eye.		Mid.		3-4
	Aviator Bleriot	H. W.	Orange yellow		Mid.		3
(2)	Baltimore Belle	Set.	Blush white	.....	Mid.	.....	3
	Christine Wright	.....	Large, salmon pink	.....	Very early	.....	3
	Climbing American Beauty	.....	Large, rose	.....	Early	.....	3
	Coquina	H. W.	Single, coral pink	.....	Late	.....	3-4
	Daybreak	H. W.	Single, bright rose	.....	Mid.	.....	3-4
	Debutante	H. W.	Pale pink	.....	Mid.	.....	3
	Delight	H. W.	Single, cherry-red	.....	Mid.	.....	3
(3)	Dorothy Dennison	H. W.	Cameo-pink	.....	Late	.....	3-4
	Dorothy Perkins	H. W.	Pink	.....	Mid.	.....	3-4
	Dr. W. Van Fleet	H. W.	Large, cameo-pink	.....	Mid.	.....	3-4
	Eisnach	H. M.	Salmon pink	.....	Early	.....	4-5
	Eliza Robichon	H. W.	Salmon yellow	.....	Mid.	.....	3
	Evangeline	H. W.	Single, pale pink	.....	Late	.....	3-4
	Excelsa	H. W.	Red	.....	Mid.	.....	3
	Farquhar	H. W.	Deep rose pink	.....	Mid.	.....	3-4
(4)	Flower of Fairfield	H. M.	Crimson	.....	Late	.....	3
	Frau Gwinnen	H. M.	Lavender pink	.....	Early	.....	4
	Gardenia	.....	Large, yellow	.....	Mid.	.....	3-4
	Goldfinch	.....	Pale yellow	.....	Mid.	.....	3-4
	Hiawatha	H. W.	Single, crimson white-eye	.....	Late	.....	3-4
	Lady Godiva	H. W.	Pale pink	.....	Late	.....	3
	Lady Gay	H. W.	Pink	.....	Mid.	.....	3-4
	Longwood	H. Set.	Light pink	.....	Mid.	.....	3-4
	Louise Sauvage	H. M.	Very dark crimson	.....	Early	.....	3
	Milky Way	H. W.	Semi-double pure white	.....	Late	.....	3
	Minnehaha	H. W.	Pink	.....	Mid.	.....	3
	Miss Helvete	H. W.	Flesh pink	.....	Mid.	.....	3
	Newport Fairy	H. Set.	Single, coral pink	.....	Mid.	.....	3
	Paradise	H. W.	Single, rose pink white-eye	.....	Early	.....	3
(5)	Paul's Scarlet Climber	.....	Large, scarlet	.....	Early	.....	4-5
	Prairie Queen	H. Set.	Lavender pink	.....	Early	.....	3
	Purity	H. W.	Large, pure white	.....	Mid.	.....	3
	Rosa Multiflora	.....	White	.....	Early	.....	3
	Rosa Setigera	.....	Pink	.....	Late	.....	3
	Rosa Wichuraiana	.....	White	.....	Late	.....	3
	Rubin	H. M.	Red	.....	Early	.....	3
	Ruby Queen	.....	Red	.....	Mid.	.....	3
	Silver Moon	H. W.	Large, cream white	.....	Mid.	.....	4-5
	Sodening	H. W.	Red silver pink reverse	.....	Late	.....	3

ROSES AND THEIR CULTURE

RAMBLERS—CONTINUED

Source d'Or	H. W.	Yellow	Mid.	3-4
Tausendschon	H. M.	Pink	Early	4
Tennessee Belle	H. Set	Red	Mid.	3
Thornless Rambler		Deep pink	Very early	3
Trier		Creamy yellow	Early	3-4
W. C. Eagan		Pale pink	Early	2-3
Wichmoss	H. W.	Light pink	Mid.	3
White Dorothy Perkins	H. W.	White	Mid.	3
Wartburg	H. M.	Lavender rose	Mid.	2-3

(1) Undoubtedly the best yellow climber for colder climates.

(2) Blooms again during August, but not as freely as the earlier flowering period.

(3) Makes extremely long canes, if old flowering wood is removed soon after blooming. Excellent for pergolas, arbors, walls, etc.

(4) Flowers intermittently until frost.

(5) One of the finest of the large flowered group of climbers. Holds color exceptionally well.

POLYANTHAS

Name	Color	Season	Flowering Habit
Anchen Muller	Bright Pink	Midseason	Continuous
Baby Elegance	Orange Yellow	Early	"
Clothilde Soupert	Flesh White	Midseason	"
Ellen Poulson	Large Pink	Midseason	Inter.
Erna Teschendorf	Dark Red	Midseason	Continuous
George Elgar	Yellow	Early	"
Gloire des Marches	Deep Crimson	Midseason	Inter.
Maman Turbat	Lavender Pink	Early	Continuous
Marie Brisonnet	Pink	Early	"
Marie Parie	Flesh White	Midseason	"
Mme. Jules Gouchault	Coral Pink	Midseason	"
Peach Blossom	Peach Pink	Midseason	"
Perle d'Or	Salmon Yellow	Early	"
Prinula	Lavender Rose	Early	"
Schnee Kopf	White	Early	Inter.
Triomphe Orleanaise	Red	Midseason	Continuous
Yvonne Rabier	White	Midseason	"

ROSES AND THEIR CULTURE

The American Rose Society has divided the United States into five zones or sections for the purpose of discovering, if possible, what type or types of roses do the best in the various sections. In answer to inquiry as to the best twelve bush roses, the replies from the five sections were nearly identical. The same thing was true in regard to the ramblers.

It is natural to suppose that in the warmer sections the tender Tea varieties would be the favorites while farther north the Hybrid Perpetuals and even Rugosa hybrids might be expected to take the lead.

The favorites are given below, being listed in order of preference:

Bush Roses

Radiance
Ophelia
Frau Karl Druschki
Columbia
Gruss an Teplitz
Mmes. Caroline Testout
Duchess of Wellington
Mrs. Aaron Ward
Los Angeles

ROSES AND THEIR CULTURE

Mme. Butterfly
Mme. Edward Herriot
Lady Alice Stanley

Ramblers

Dr. W. Van Fleet
Silver Moon
Paul's Scarlet Climber
American Pillar
Dorothy Perkins
Climbing American Beauty
Tausendschön
Excelsa
Gardenia
Christine Wright
Crimson Rambler
Aviateur Bleriot and Hiawatha
might well be added to complete
the list of best climbing roses.

The beginner in the rose game cannot go wrong if he sticks to the above mentioned list no matter where he is located.

Do not invest too heavily in the newer introductions from Europe. Few of the prize winning varieties of England and Ireland make good in this country. Try a few by all means and grow them for at

ROSES AND THEIR CULTURE

least three years before passing final judgment. Frequently a change of position in the garden will cause a hitherto useless rose to become one of the best. Don't be discouraged. "Where there's a will there's a way" is always true in rose growing.

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